

# Medical Imaging International

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## Data Integration Agreement to Improve Workflow in PET Imaging

Medrad, Inc. (Warrendale, PA, USA; [www.medrad.com](http://www.medrad.com)) and Pinestar Technology, Inc. announced plans to enable data communication between Medrad's Intego PET Infusion system and Pinestar Technology Inc.'s (Greenville, PA, USA; [www.pinestar.com](http://www.pinestar.com)) nuclear medicine information system (NMIS). The companies are closing the information gap between state of the art infusion systems and the latest information systems, and thus adding to the workflow benefits of auto-

mated fluorodeoxyglucose (FDG) infusion.

The data integration establishes effective communication of PET infusion schedules and histories, and it will be the first of its kind in the market. Large hospitals and even smaller growing PET clinics are challenged to contain costs, reduce errors, and increase their quality of service – even in the face of increasing procedure volumes. Moreover, there is growing interest in electronic medical records across all departments. Therefore, intelligent communication between systems is of utmost importance.

Image: The Intego positron emission tomography (PET) Infusion system (Photo courtesy of Medrad).

"Integrating the Intego system with NMIS streamlines PET workflow and reduces needless errors, it's what PET clinics are asking for," said Doug Descalzi, executive director of Medrad's molecular imaging business. "Plus, the integration will compound the workflow benefits that users experience compared to operating the systems independently."

"Interfacing Intego with Pinestar's NMIS reduces redundant patient demographic entries and transcription errors. Completed dose records are transferred back to the NMIS after the FDG infusion. The technologists will spend more time administering patient care and less time typing," stated Pinestar president Chet Mody.

Pinestar Technology is a supplier of equipment and accessories in the diagnostic radiology and medical fields and a distributor of medical products and software and manufactures custom-designed table and stretcher pads. Pinestar also develops computer hardware and software serving the medical industry.

Medrad, Inc. develops, markets, and services medical devices used to diagnose and treat disease. Its product range includes fluid injection systems for radiology and cardiology, endovascular devices for the safe treatment of cardiovascular disease, magnetic resonance-compatible accessories, and equipment services.

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# Powerful Imaging. Penetrating Insight. Sound Diagnosis.

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### Penetrating Insight. Sound Diagnosis.

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**Virtual Touch™ HD Technology\*** – Siemens' second generation implementation of Acoustic Radiation Force Impulse (ARFI) technology has even greater sensitivity and accuracy. In combination with the 9L4

transducer, it provides increased flexibility to encompass small parts, breast, and thyroid as well as abdominal imaging.

**Cadence Contrast Pulse Sequencing Technology\*\*** enhancements provide increased sensitivity and specificity to contrast agents for enhanced detection and display. Additional functionality, such as a real-time overlay of the contrast agent image on the B-mode image and Cadence CPS Capture for detailed vascular "roadmapping", provides more options for contrast images.

**Skeletal Rendering** – Proprietary volumetric rendering technique delivers superior visualization of the fetal spine and long bones with never-before-seen detail.

### Expanded Cardiovascular Functionality\*

Dynamic TCE technology, a powerful new algorithm combining advanced speckle reduction with enhanced contrast resolution, is now available on all phased array cardiology transducers. ACUSON AcuNav™ ultrasound catheters enable ICE exams. Expanded eSieScan™ workflow protocols provide more flexibility to streamline workflows. Stress echo and clip capture enhancements provide more options when performing exams. Anatomical M-mode corrects for off-axis alignment to deliver anatomically accurate M-mode imaging.



\* Not commercially available in the United States

\*\* At the time of publication, the U.S. Food and Drug Administration has cleared ultrasound contrast agents only for use in LVO. Check current regulations for the country in which you are using this system for contrast agent clearance



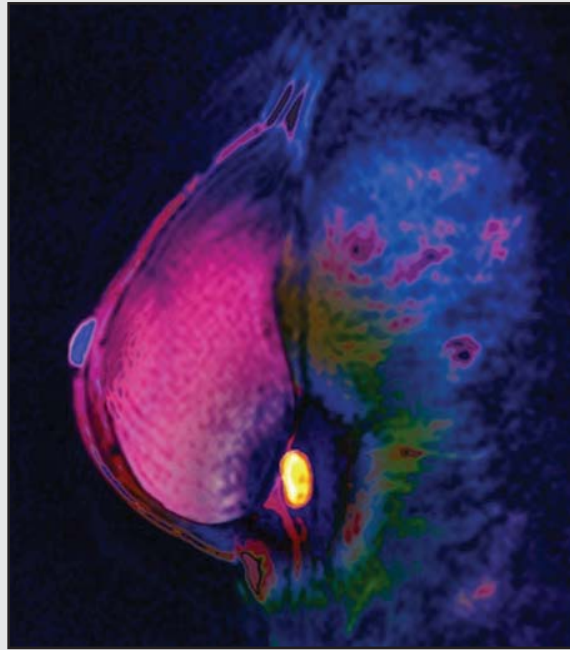
## Breast MRI May Reduce Local Breast Cancer Recurrence Rates

The use of preoperative breast magnetic resonance imaging (MRI) prior to surgical intervention (for the treatment of breast cancer) can reduce the number of local (confined to the breast) tumor recurrences at follow-up, according to new research.

The study's findings were presented May 3, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting in San Diego, CA, USA. MRI of the breast is a noninvasive medical test that helps physicians diagnose and treat breast cancer. "Local and regional recurrences after breast-conserving surgery are rare events," said Valeria Dominelli, M.D., lead author of the study. "However, young age and breast density put patients at a greater risk," said Dr. Dominelli.

The study, performed at the University of Rome "La Sapienza" (Italy; [www.uniroma1.it](http://www.uniroma1.it)), included 49 patients with a local recurrence that was detected after surgical treatment of the primary carcinoma. Ten patients had a contrast-enhanced MRI prior to surgery while the remaining 39 patients did not. Contralateral carcinoma and local recurrence were seen significantly more in patients who did not receive an MRI examination prior to surgery.

"Our study suggests that preoperative breast MRI staging allows for a significant reduction in



the number of local cancer recurrences at follow-up," concluded Dr. Dominelli. "Breast MRI should be recommended to patients with breast cancer for a better evaluation of the extent of disease."

Image: Colored magnetic resonance imaging (MRI) scan of the breast of a 50-year-old woman with breast cancer (Photo courtesy of Zephyr / SPL).

## Integrated Proton Therapy System Features Pencil-Beam Scanning Technology

A new proton therapy platform incorporates imaging, gating, robotic patient positioning, treatment planning, and oncology information software to enhance treatment quality for patients and workflow efficiency for clinicians.

Varian Medical Systems (Palo Alto, CA, USA; [www.varian.com](http://www.varian.com)) introduced the fully integrated ProBeam proton therapy system at the 2010 Particle Therapy Cooperative Group (PT-COG) meeting held in Gunma, Japan, in May 2010. "ProBeam is the result of decades of leadership in proton therapy research and development and it has been designed from the ground-up to meet the needs of clinicians and patients alike," said Moataz Karmalawy, head of Varian's particle therapy group. "This fully integrated system can be used for all forms of advanced proton therapy including image-guided proton therapy and intensity-modulated proton therapy."

The ProBeam system incorporates Dynamic Peak integrated scanning technology, which paints a precise radiation dose on the target volume, enabling true intensity-modulated proton therapy. The system also incorporates proprietary pencil-beam scanning technology, which allows for precise dose distribution.

Utilizing the proven technology of Varian's 250 MeV superconducting cyclotron and features, the ProBeam system includes a streamlined treatment

console with a modern, graphical, easy-to-use interface that consolidates all controls for imaging, treatment, and motion management. Treatment process and workflows are simplified and easy to learn, with a 'follow the light' guidance system that is designed to enhance usability and promote safety by guiding therapists through the steps of even the most complicated treatments.

The ProBeam interface has the same revolutionary design as Varian's recently announced TrueBeam system for radiation therapy and TrueBeam STx system for radiosurgery. "It's structured and organized the way oncology clinics work every day," added Mr. Karmalawy.

"ProBeam simplifies the proton therapy treatment process for clinicians and patients alike," remarked Lester Boeh, head of Varian's emerging businesses group. "Varian is bringing the same integrated, automated, and versatile approach to proton therapy as it has for many years of leadership in radiation therapy."

Varian Medical Systems is a world-leading manufacturer of medical devices and software for treating cancer and other medical conditions with radiotherapy, radiosurgery, proton therapy, and brachytherapy. The company supplies informatics software for managing comprehensive cancer clinics, radiotherapy centers, and medical oncology practices.

# Medical Imaging International

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## Digital Radiography Technology Provides Instant Image Previews and Fast Cycle Times

Busy radiology departments in Canada will now benefit from exceptional image quality, fast previews, and efficient design with new digital radiography (DR) technology.

Agfa HealthCare (Mortsel, Belgium; [www.agfa.com/healthcare](http://www.agfa.com/healthcare)), a leading provider of diagnostic imaging and healthcare information technology (IT) solutions, reported that its DX-D 500n direct radiography system is now available in Canada. The system delivers instant previews, fast cycle times, a unified look and feel for computed radiography (CR) and digital radiography (DR) exams, and streamlined workflow procedures through its NX workstation and Musica2 image processing. In combination with Agfa HealthCare's CR systems, the DX-D 500n addresses the needs of the full range of general radiology exams.

"Agfa HealthCare's DX-D solutions deliver fast cycle times, which can result in accelerated productivity, improved patient comfort, and efficiency in radiography departments. Providers and patients benefit from consistent image quality, the potential for dose reduction, and streamlined workflow," stated Dirk Debusscher, vice president Imaging. "Because Agfa HealthCare is the only company to offer needle quality in both its DR and CR detectors, choosing Agfa HealthCare's DX-D and CR systems can assure providers of high imaging quality, as well as enhanced productivity."

Designed for hospital departments and imaging centers that manage up to 125 exams daily, the DX-D 500n offers patient comfort along with effectiveness. Patients appreciate shorter exam times, while radiologists can receive the quality images they need for rapid diagnosis. The unit allows for fast and efficient upright imaging through a high-quality wall stand, while panels fixed in the table deliver added versatility. The system's cassette-less workflow allows radiographers to preview images, complete studies in a limited number of steps, and quickly return to patients. Needle-based panels offer high image quality and the potential for lower dose, which can translate into higher diagnostic confidence, flexibility, and speed.

"Agfa HealthCare's DX-D 500n DR system and CR systems offer providers complete imaging solutions to meet their digital image capture requirements. The result is sharp, consistent images, workflow efficiency, integration, and ease of use," remarked

Michael Green, president and CEO, Agfa HealthCare-North America. "No matter where providers are in their digital migration, Agfa HealthCare has the solutions to complement their workflow and operations models. They can easily build on their NX experience with the DX-D 500n or begin a new family of Agfa HealthCare DR and CR solutions."

Image: The DX-D 500n direct radiography system (Photo courtesy of Agfa HealthCare).



## U 50 Diagnostic Ultrasound System



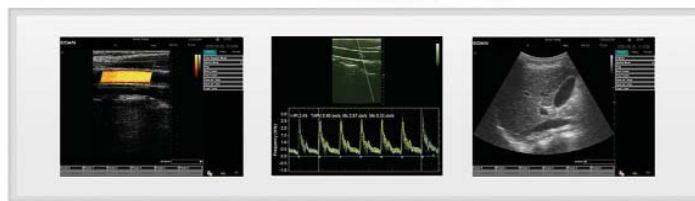
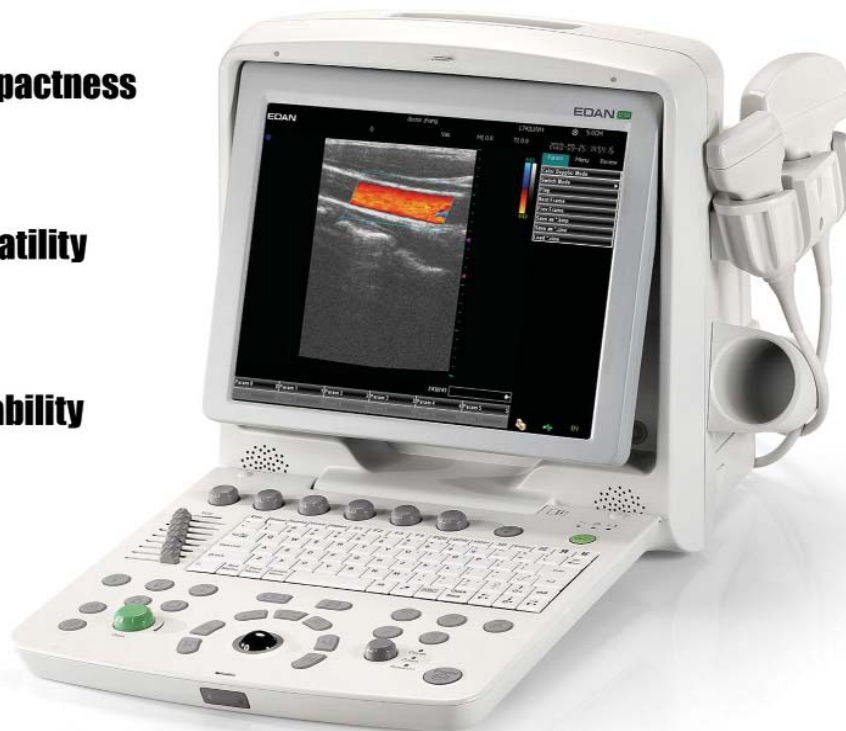
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## All-In-One Color Doppler Ultrasound Scanner/PC Developed

The innovative architecture of the first all-in-one ultrasound scanner embeds a scanner and a personal computer (PC) as one conveniently transportable unit.

The PC and scanner are built entirely within the dimensions of a wide, high-resolution 19-inch touch screen thin-film transistor liquid (TFT) liquid crystal display (LCD) panel, and integrate a fully featured, power efficient computer running Microsoft Windows 7 Ultimate similar to a modern PC. This new type of scanner is as simple to use as Plug and Click to run the ultrasound software and general computer software. The probe is connected to the system as if it were another input device. The Comboscan HD can be placed on a trolley, wall-mounted, or simply used as a desktop. A second external LCD monitor can be connected for extended desktop use.

Primarily targeted at the general imaging, sports medicine, ob/gyn, vascular, and urology markets in private practices and clinics, the Comboscan HD is a CE-certified multipurpose color Doppler ultrasound scanner. It produces high-quality compound images comparable to famous cart or laptop-type ultrasound scanners and comes with a full suite of applications-specific probes, calculation package, customizable reports, and unlimited user presets.

The Comboscan HD can be controlled directly via touch screen, PC keyboard, and mouse, or with an optional dedicated ultrasound scanner keyboard. There is no need to have different keyboards whether the user is operating the ultrasound or working on the PC. The user can minimize the ultrasound software and return to Windows and other running applications.

The unique patented scanner/PC design of this device gives sonographers the freedom of installing any of their patient management software tools, as well as run their usual office software suite for email, web browsing, and word processing. Moreover, they can live-conference with colleagues during real-time patient scanning allowing unprecedented telemedicine applications and archive studies on picture archiving and communications system (PACS) via Digital Imaging and Communications in Medicine (DICOM) support.

"We believe our concept will attract medical doctors for its multipurpose ultrasound Doppler functionalities, cost effectiveness, space saving, and convenience and usability; whereas from a single device they can accomplish their ultrasound diagnostics, patient follow up, reporting and archiving tasks as well as install any of their usual office software tools" commented Stephane Hollande, director of engineering at Ambisea Technology. "Our Comboscan HD has also all the features of a modern computer with internet connectivity, a large hard drive and memory capacity, and even a DVD burner for recording keepsakes."

Ambisea Technology Corp., Ltd. (Hong Kong; www.ambisea.com), is an ISO13485-certified company that specializes in developing and selling innovative portable medical devices. Its main product lines are ultrasound scanners and patient monitors for both medical and veterinary use. Due to its location in China, Ambisea additionally acts as a sourcing and purchasing agent for European and American companies

## New Gated Radiotherapy Technology Has Advanced Motion Management

New advanced motion management capabilities, including gated RapidArc, has been added to a radiotherapy platform for treating cancer with targeted radiotherapy (RT). A set of sophisticated new tools now enables clinicians to monitor and adjust for tumor motion during treatment, and to utilize respiratory gating during a RapidArc treatment.

"Extensive research and development into motion management systems has culminated in powerful new capabilities that will be standard on the new Trilogy accelerators and available as an upgrade on our large installed base of Trilogy and Clinac iX machines," said Dow Wilson, president of Varian Medical Systems' (Palo Alto, CA, USA; [www.varian.com](http://www.varian.com)) oncology systems business. "Our Clinac iX and Trilogy accelerators together with our new TrueBeam platform can now offer clinics an unmatched combination of motion management, speed, and versatility."

Gated RapidArc radiotherapy makes it possible to monitor patient breathing and compensate for tumor motion while quickly delivering dose during a continuous rotation around the patient. This development enables the use of RapidArc to target lung tumors with greater precision by "gating" the beam – turning it on and off – in response to tumor motion. "With the new Gated RapidArc, it is possible to deliver highly targeted treatments to many types of tumors, including lung tumors that are moving, in less time than would otherwise be required," said Mr. Wilson.

The new Trilogy system also incorporates an open interface that can be used with positioning devices such as the Calypso Medical (Seattle, WA, USA; [www.calypsomedical.com](http://www.calypsomedical.com)) system, allowing clinicians to monitor tumors in real time, gate the beam if the tumor moves outside of a predefined area, and make targeting adjustments when necessary. Varian and Calypso have been developing this capability under a strategic agreement to produce jointly products that integrate the two companies' technologies. "A recent peer-reviewed study [by H.M. Sandler, et al, published in the May 2010 issue of the journal *Urology*] shows that gating the beam and repositioning the patient on the basis of signals from Calypso implanted transponders results in a significant reduction in patient reported side effects when delivering prostate cancer radiotherapy in the presence of tumor motion. Our new interface automates this process," said Corey Zankowski, Varian's senior director of product management.

The motion management interface can also be used with surface imaging technologies from companies such as Vision RT to position the patient, to monitor continuously for any movement, and to gate the treatment beam either as a result of detected patient motion or according to the

patient's breathing cycle.

The interface also opens the door for other third party companies to connect their devices to Varian accelerators for the purpose of monitoring motion. These capabilities are of particular importance during frameless radiosurgery and stereotactic body radiotherapy (SBRT) treatments. "Varian is committed to the continual development of an open architecture that makes it possible to interface with third-party technologies for the advancement of clinical care," Mr. Zankowski added. "By working with other companies, we can offer clinics different methods for gathering and acting upon real-time information about tumor position during treatment."

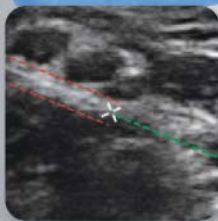
The Trilogy accelerator with gated RapidArc and advanced motion management is available to customers now. There are more than 1,600 Varian Clinac iX and Trilogy accelerators installed worldwide, eligible for upgrade with these new technologies.

"We anticipate that these enhancements will bring us another step closer to our mission of helping to save another 100,000 lives each year," Mr. Wilson said. "Along with the new TrueBeam system that we introduced for oncology thought leaders interested in pioneering new approaches to cancer treatment, we now have the widest spectrum of advanced treatment solutions to meet the needs of our very diverse customers around the world."

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## 2x Estimated Radiation Risks with Abdominal/Pelvic CT Scans in Younger Patients

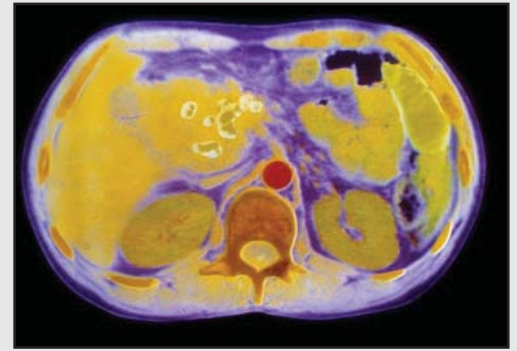
In younger patients, the estimated radiation risks associated with abdominal and pelvic computed tomography (CT) scans are twice those of older patients, according to recent findings.

"Estimating the risks associated with ionizing radiation is complex," said James Koonce, M.D., lead author of the study. "Many variables such as patient size, age, and the region of the body being imaged all effect the total risk. Our study looked at how the overall risks associated with abdominal/pelvic CT scans depend on patient sex and age," stated Dr. Koonce.

The study, performed at the Medical University of South Carolina (Charleston, SC, USA; [www.musc.edu](http://www.musc.edu)) included 51 patients who under-

went routine contrast-enhanced abdominal and pelvic CT examinations. "We found that the estimated radiation risk for a 31-year-old [0.91 per 1,000] was about double that for a 74-year-old [0.47 per 1,000]. The median radiation risk to 25 males was 0.61 per 1,000 and for 26 females was 0.74 per 1,000," said Dr. Koonce.

The study was presented May 3, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting, held in San Diego, CA, USA. "Clinicians ordering imaging tests must use their best clinical judgment to select patients with a reasonable pre-test probability that the diagnosis afforded by CT will give valuable information to effect patient management. Knowing the risk



involved with radiation exposure to a patient during an abdominal/pelvic CT allows for more accurate risk benefit evaluation when a physician is deciding whether or not to order an exam," concluded Dr. Koonce.

*Image: False-color computed tomography (CT) X-ray scan through the human abdomen, showing the liver (left) and spleen (right) (Photo courtesy of CNRI / SPL).*

## Imaging Agents in Development for Evaluation of Coronary Artery Disease and Heart Failure

Research presentations on two new nuclear imaging agents developed for coronary disease were presented in a medical meeting in June 2010.

Lantheus Medical Imaging, Inc. (North Billerica, MA, USA; [www.lantheus.com](http://www.lantheus.com)), a company focused on diagnostic imaging technology, announced that 14 new abstracts from two of the company's positron emission tomography (PET) products in development were presented at the SNM (Reston, VA, USA; <http://interactive.snm.org>) 57th annual meeting, being held June 5-9, 2010, in Salt Lake City, UT, USA. Preliminary data from a phase 2 study on flurpiridaz F-18 (formerly known as BMS747158), a myocardial perfusion PET imaging agent to diagnose coronary artery disease, and phase 1 data on LMI1195, an innovative cardiac neuronal PET imaging agent, was featured in a series of oral and poster presentations at the meeting.

"The amount of data on two of our PET cardiac

imaging candidates that will be presented at this year's SNM annual meeting highlights the progress and commitment of Lantheus in advancing our pipeline. We are pleased to be able to share this information with the scientific community," said Don Kiepert, president and chief executive officer of Lantheus Medical Imaging, Inc.

Flurpiridaz F-18, a fluorine 18-labeled agent that binds to mitochondrial complex 1 (MC-1), is designed to be a novel myocardial perfusion PET imaging agent for the diagnosis of coronary artery disease (CAD). Flurpiridaz F-18 has completed phase 2 clinical trials. CAD is the leading cause of death in the United States for both men and women. Each year, more than half a million in the United States alone die from CAD.

Phase 1 studies indicated that flurpiridaz F-18 is well tolerated and demonstrates radiation dosimetry that is comparable to, or less than, that of other PET

imaging agents. The data also showed high myocardial uptake at rest that significantly increased with pharmacologically induced stress as well as a ratio of myocardial to background uptake that was favorable and improved over time, suggesting its strong potential as a myocardial perfusion PET-imaging agent for patients both at rest and under stress.

LMI1195 is a novel F-18 small molecule tracer designed to use molecular imaging and PET technology to improve imaging of cardiac neuronal function. LMI1195 is currently in phase 1 clinical trials. In preclinical studies, LMI1195 showed promise as a heart failure imaging agent with high cardiac sympathetic nervous system uptake.

Lantheus Medical Imaging discovers, develops, and markets innovative medical imaging agents to provide a strong platform from which to bring forward breakthrough new tools for the diagnosis and management of disease.

## fMRI, Optogenetics Research on Brain Activity Yields Clues into Neural Circuitry

Combined with new optics and gene technology, functional magnetic resonance imaging (fMRI) is now being used to evaluate the brain-wide impact of changes in neural circuitry, such as ones that may underlie many neurologic and psychiatric diseases.

Similar to a motorist who realizes that the "check engine" light indicates something important but ill-defined is occurring, neuroscientists have relied heavily on an incompletely understood technology called fMRI to reveal what the brain is doing when people respond to different stimuli. The noninvasive technology offers a view into the physiology of human cognition and emotion, but – without a real clarification of how some common fMRI signals are produced – the ability of researchers to draw conclusions has been limited. Now a Stanford University School of Medicine (Stanford, CA, USA; [www.stanford.edu/MedCenter/MedSchool](http://www.stanford.edu/MedCenter/MedSchool))-led team has solved the mystery, and in doing so has discovered a new way to make fMRI signals based on increased blood flow even more useful when com-

bined with optogenetics (a technology developed at Stanford that employs genes from microbes to allow neurons to be controlled with pulses of light).

The team's research was published May 16, 2010, in the online version of the journal *Nature*. The study is the first to validate what neurologists could only hope was true: that fMRI signals based on heightened levels of oxygenated blood in specific parts of the brain are caused by an increase in the excitation of specific kinds of brain cells. For example, in the past investigators could only assume that when they showed subjects a picture of someone they knew, stronger fMRI signal in a part of the brain that perhaps deals with face recognition was caused by the excitation of neurons, rather than some other factor.

These signal increases are measured using the blood oxygenation level-dependent (BOLD) technique. Because researchers have published more than 250,000 articles utilizing or building upon the BOLD technique, clarifying its true meaning is very important, according to senior author Karl Deisseroth, M.D., Ph.D., associate professor of bioengineering

and of psychiatry and behavioral sciences.

The key experiment involved turning on genetically engineered excitatory neurons in an experimental group of rats in the presence of blue light delivered via a fiberoptic cable. The researchers then anesthetized the rats and looked at their brains with fMRI. They discovered that exciting these defined neurons with the optogenetic light generated the same kind of signals that researchers see in traditional fMRI BOLD experiments – with the same complex patterns and timing. In the control group of rats, which were not genetically modified, no such signals occurred. This showed that true neural excitation indeed produces positive fMRI BOLD signals.

In one experiment, for example, the investigators could see how activity they stimulated in the thalamus, a major relay center deep in the brain, could affect circuits stretching into the somatosensory cortex, a surface brain region important in processing sensation. "We can now ask what the true impact of a cell type is on global activity in the brain of a living mammal," Dr. Deisseroth concluded.



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## Molecular Imaging Provides Early Diagnosis, Treatment for Patients with Aortic Dissections

Recent research revealed that molecular imaging could help physicians detect aortic dissection – a frequently lethal blood vessel condition – and help guide treatment.

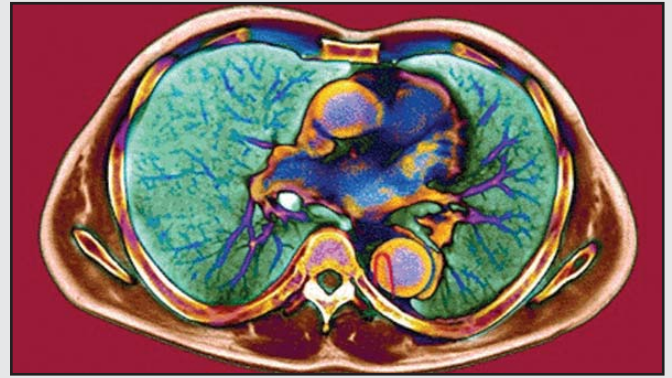
Aortic dissection occurs when a tear in the wall of the aorta causes blood to flow between the layers of the wall of the aorta and force the layers apart. The study's findings were published in the May 2010 issue of the *Journal of Nuclear Medicine (JNM)*. "Many conventional forms of imaging are not able to clearly differentiate between acute and chronic dissection," said Hans-Henning Eckstein, M.D., Ph.D., a professor at the Technical University of Munich (TUM; Germany; <http://portal.mytum.de>) and corresponding author of the study. "It is critical to patients' survival that doctors are able to verify acute or exclude chronic aortic dissection so they can decide the best course of treatment – whether that means rushing the patient to surgery in some cases or using beta blockers to lower the blood pressure."

Aortic dissection is the 10th leading cause of death in Western societies. It is the second most frequent cause of acute chest pain. In clinically unclear cases, use of a sophisticated imaging technique – positron emission tomography (PET) with the imaging agent fluorodeoxyglucose (FDG) and computed tomography (CT) – may help determine the age of an aortic dissection, the level of risk, and the need for surgery. Articles by researchers in Japan, Germany, and the United

Kingdom reported on the results of two studies that used FDG PET/CT to diagnose aortic dissection.

In the Munich study, researchers assessed patients who had symptoms of aortic dissection and patients with chronic asymptomatic dissection using FDG PET/CT to acquire images of the affected area, just above the heart. These images were studied to determine the difference between the two forms of aortic dissection. The investigators noted that acute dissection of the aortic wall led to elevated metabolic activity in fresh lacerated segments of the aortic wall, while stable chronic aortic dissection showed no increased metabolic activity. They speculated that increased metabolic activity in cases of acute aortic dissection is due to repair processes of the aortic wall injury, causing cell activation and accumulation, and that low metabolic activity in chronic aortic dissection is due to scar tissue. Additional studies, according to the researchers, are needed to validate these hypotheses.

In another study reported in the same issue of *JNM*, researchers in Japan found that greater metabolic activity in acute aortic dissection was considerably associated with increased risk for rupture and progression. The study demonstrated that FDG PET/CT might be used to improve patient management, although more studies are still needed to clarify its role in the clinical set-



ting.

"Usually, it is difficult to predict poor outcome for patients receiving medical treatment for acute aortic dissection," said Toyooki Murohara, M.D., Ph.D., F.A.H.A., a professor at Nagoya University Graduate School of Medicine (Japan; [www.med.nagoya-u.ac.jp](http://www.med.nagoya-u.ac.jp)) and one of the authors of the study. "This study will give us new information to evaluate the degree of the patients' illness."

"Early diagnosis and treatment are essential for survival of patients with this rare and often fatal disease," concluded James H.F. Rudd, M.D., Ph.D., M.R.C.P., a researcher and consultant cardiologist at the University of Cambridge (UK; [www.cam.ac.uk](http://www.cam.ac.uk)), who authored an invited perspective article in *JNM* on the role of 18F-FDG PET in aortic dissection. "Although further studies are needed, this research suggests that FDG PET imaging might be used to identify patients who are at a very high risk of complications, allowing them to be fast-tracked to surgery."

*Image: Colored computed tomography (CT) scan of a patient with a dissection of the aorta (Photo courtesy of Du Cane Medical Imaging).*

## Technology Devised for Breast Cancer Imaging Can Reduce Time from Detection to Diagnosis

New contrast-enhanced spectral mammography (CESM) technology reduces ambiguity in mammography results, enabling physicians to detect and diagnose cancer with more confidence – even in the densest part of the breast tissue more rapidly and accurately.

GE Healthcare (Chalfont St. Giles, UK; [www.gehealthcare.com](http://www.gehealthcare.com)), a developer of digital mammography, announced the introduction of an innovative technology to help in breast cancer diagnosis. GE Healthcare's new SenoBright CESM technology, working like the multiple-flash, red-eye reduction function in a digital camera, uses X-rays at multiple energies to create two separate exposures. These resulting images specifically illuminate and highlight areas where there is angiogenesis, growth of small blood vessels potentially related to the presence of cancer.

"A CESM exam takes from 5 to 10 minutes," said Dr. Clarisse Dromain,

Gustave Roussy Cancer Institute (Villejuif, France). "During my investigation of the use of CESM with my own examinations of patients, I have been able to better define the spread of a cancer compared to standard mammography and ultrasound, and follow-up exams with an MRI [magnetic resonance imaging] validated exactly the same results. Moreover, in the majority of cases the confidence in the diagnosis is high enough that the patient can be told the results that same day," she added.

SenoBright enables the digital mammography system to detect a completely new type of diagnostic data. Standard mammography only sees the structure of breast tissue. With SenoBright, clinicians can also locate the proliferation of small blood vessels, potentially associated with cancerous tumor growth. In addition, it shows potential for measuring the extension of the lesion to help to plan surgery and treatment. Patients receive an

intravenous injection of standard iodine contrast agent, and after two minutes undergo a five-minute digital mammography exam. CESM images are acquired in familiar mammography views so that they can be quickly and easily correlated with conventional findings, facilitating interpretation by other specialists such as surgeons or oncologists.

"Worldwide, more than 1.2 million people annually are diagnosed with breast cancer. Since 1965, GE Healthcare has made significant progress in providing solutions for breast cancer detection and diagnosis that really bring a change to people's lives. Today through 'healthymagination,' we continuously develop innovations to reduce costs, increase access and improve quality and efficiency of healthcare delivery around the globe," said Reinaldo Garcia, president and CEO of GE Healthcare for Europe, Middle East, and Africa (EMEA). "GE Healthcare is



pleased to bring to market such advanced breast imaging technologies like SenoBright, the result of over 10 years and [US]\$12 million investment of research and clinical collaborations. This innovative technology will support the earlier diagnosis of this prevalent disease, by providing access to new diagnostic information at a lower cost."

*Image: The SenoBright platform for breast cancer imaging (Photo courtesy of GE Healthcare).*



## Hybrid Imaging Developed to Simplify Nuclear Medicine and Address Clinicians' Needs

New imaging time-of-flight (TOF) positron emission tomography (PET) technology measures the actual time difference between the detection of coincident gamma rays for more accurate localization, producing a higher quality image with shorter imaging times and allowing for lower tracer dose amounts in patients, as well as increased diagnostic confidence.

At this year's Society of Nuclear Medicine (SNM) annual meeting, held in June 2010 in Salt Lake City, UT, USA, Philips Healthcare (Best, The Netherlands; [www.medical.philips.com](http://www.medical.philips.com)) presented its product range in the field of nuclear medicine. The company displayed solutions designed to increase diagnostic accuracy, improve patient comfort, augment physician confidence, simplify clinical workflow, and lower lifecycle costs.

"With increased demand for improved quality of care and rising healthcare costs, it's more important than ever before to help our customers diagnose and treat patients effectively and efficiently," said Jay Mazelsky, senior vice president and general manager, computed tomography and nuclear medicine, for Philips Healthcare. "Philips is determined to simplify nuclear medicine by using clinician insights to drive innovation and deliver solutions that unlock the clinical potential of hybrid imaging and help to improve patient care."

Philips' range of nuclear medicine technologies addresses the needs of physicians and their oncology, cardiac, neurology, or orthopedic patients. This year at SNM, Philips presented new features to the BrightView XCT, including new Full Iterative Technology (FIT), which makes the BrightView XCT the first and only single photon emission tomography/computed tomography (SPECT/CT) system with both iterative SPECT and CT reconstruction capabilities. The new low-dose, flat-panel CT iterative reconstruction improves localization through better uniformity and less noise leading to improvements in soft tissue image quality for applications such as orthopedic cases. Available in more than 135 sites worldwide, BrightView XCT addresses the need to keep patient dose low without sacrificing image quality and accuracy.

Already outfitted with the Philips Astonish advanced reconstruction algorithm, the new FIT further enhances the only CT platform designed specifically for nuclear medicine. BrightView XCT Astonish image reconstruction technology provides significant spatial resolution improvement in cardiac SPECT studies compared to SPECT studies using filtered back projection. With FIT and Astonish, BrightView XCT helps enable low patient X-ray dose levels, high-resolution localization, and high-quality attenuation correction with the potential for fewer artifacts and shorter exam times. Philips reported new clinical evidence that Philips' Astonish algorithms for nuclear cardiology help clinicians improve their diagnostic accuracy and increase

their diagnostic confidence.

The BrightView XCT has a wide-open gantry and large bore that contributes to a positive patient experience. It offers the first flat panel X-ray detector to be used for CT imaging in nuclear medicine. Moreover, it is so compact that it fits in the same size room as a small SPECT camera. Concurrent technology makes image acquisition quicker, makes it easier to work with and evaluate images, and makes it possible to conduct multi-isotope evaluations simultaneously.

Philips innovations are expanding the clinical utility of PET/CT in oncology, allowing healthcare providers the ability to consolidate radiation oncology procedures, increase the potential for greater accuracy, and improve scheduling.

The Gemini Big Bore system, now in over 35 sites worldwide, offers excellent lesion detection ability for diagnosis and staging. Gemini TF Big Bore is the world's first big bore PET/CT system combining advanced Gemini TF PET image quality with Brilliance CT big bore performance.

Philips will provide updates on clinical studies being conducted using Philips' investigational whole body PET/MR imaging systems at the University of Geneva (Switzerland) and Mount Sinai Medical Center (New York, NY, USA). These studies extend both to oncologic and to cardiovascular applications of the technology and are designed to take advantage of the soft-tissue contrast capabilities of magnetic resonance imaging (MRI).

## Latex gloves make great balloons but they make lousy probe covers.

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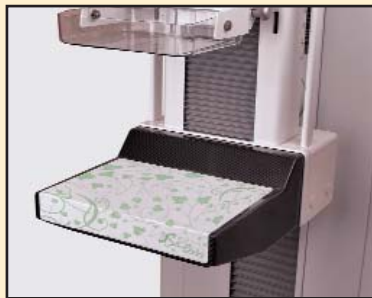
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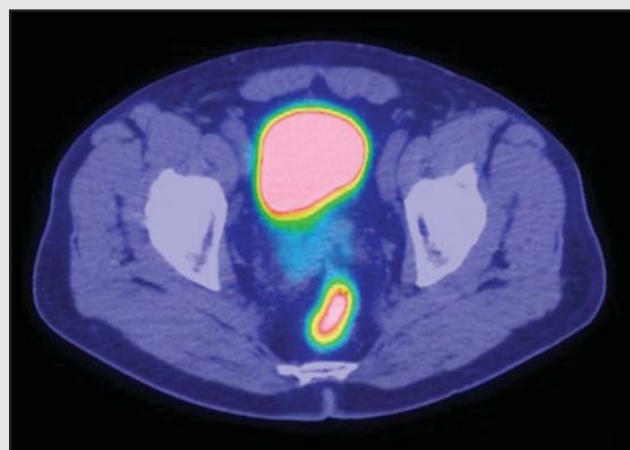
## FDG-PET/CT Plays Significant Role in Detecting Colorectal Cancer Recurrence

The use of combined positron emission tomography and computed tomography (PET/CT) can confirm a suspected colorectal cancer recurrence at an early stage, helping significantly in treatment planning and improved targeted patient care.

PET/CT is a type of nuclear medicine imaging that uses traces of radioactive material to diagnose or treat many types of cancers. Colorectal cancer is the fourth most common cancer in the United States and the second most common in Europe. "With modern surgical techniques and advanced chemotherapy, growing subsets of patients with colorectal cancer recurrences are being considered for treatment with curative intent. Therefore, accurate restaging and early detection of recurrence is important," said Rohit Kochhar, M.D., lead author of the study.

The study, performed at the Christie NHS [National Health Service] Foundation Trust (Manchester, UK; [www.christie.nhs.uk](http://www.christie.nhs.uk)) included 71 patients with suspected colorectal recurrence. Fifty-one patients had a suspected local recurrence based upon traditional CT or magnetic resonance imaging (MRI) and 20 patients had a suspected recurrence based upon a carcinoembryonic antigen (CEA) test with unremarkable conventional imaging results.

All 71 patients underwent a PET/CT scan to confirm/disconfirm recurrence. "PET/CT accurately confirmed a recurrence in 40/71 patients. This shows that PET/CT has a definite role in the management of patients with recurrent colorectal cancer in addition to conventional imaging and



the CEA test," concluded Dr. Kochhar.

The study was presented May 5, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting, held in San Diego, CA, USA.

*Image: Colored composite computed tomography (CT) and positron emission tomography (PET) scans through the abdomen of a patient with sigmoid colon cancer (Photo courtesy of ISM / SPL).*

## Renal Transplant Complications Detected by SPECT/CT Fused Imaging

A recent study suggests that the use of both physiologic and structural images acquired from single photon emission computed tomography/computed tomography (SPECT/CT) hybrid imaging can help clinicians to better diagnose and treat patients suffering from a number of renal-transplant-associated complications.

"SPECT and CT fused images provide both functional and anatomical information about the kidney, which provides better diagnostic capability and greater confidence to our physicians," said Shashi Khandekar, administrator of the nuclear medicine department, Cleveland Clinic (Cleveland, OH, USA; <http://my.clevelandclinic.org>). "We are becoming more technologically savvy and we strongly feel that as more and more clinicians use hybrid SPECT/CT imaging, technologists also need to be prepared and acquire all of the necessary qualifications for this technology."

The study combined SPECT and CT imaging techniques to provide an in-depth portrait of the biologic processes of renal function. Conventionally, physicians have used two-dimensional planar imaging to evaluate post-renal-transplant complications, which include urinary leak, infection, and transplant nonviability or kidney failure. However, a recent retrospective study conducted by the Cleveland Clinic revealed that three-dimensional (3D) SPECT/CT hybrid imaging is suitable for imaging these and other disease states. Employing SPECT/CT imaging may even answer clinical questions that could otherwise have led to additional imaging studies, invasive biopsies, and delayed treatment for the patient.

The retrospective study involved 12 renal transplant cases in which 10 patients were suspected of having a urinary leak, 1 patient showed evidence of kidney failure and 1 patient was thought to have a

transplant-associated infection. After traditional planar imaging, all patients were scanned using non-circular SPECT imaging and low dose noncontrast CT imaging using a hybrid SPECT/CT system.

The use of SPECT/CT with <sup>99m</sup>Tc-MAG3, an imaging agent taken up by the kidneys and used to assess renal function, helped clinicians positively detect urinary leaks for 7 of the 10 patients when fused imaging revealed fluid outside the anatomic confines of the patients' urinary system. The molecular imaging technique was also able to successfully identify kidney failure using the same agent, and infection was detected in one patient injected with <sup>111</sup>In labeled WBC (white blood cell), an agent that helps image leukocyte activity associated with the body's immune response.

The study's findings were presented at the Society of Nuclear Medicines (SNM) 57th annual meeting, June 5-9, 2010, in Salt Lake City, UT, USA.



## PET Probes Provide Clues into Immune Cellular Function

A commonly used probe for positron emission tomography (PET) scanning and a new probe developed by researchers reveal different functions in diverse cells of the immune system, providing a noninvasive and much clearer outlook of an immune response in action.

The probes, commonly used fluorodeoxyglucose (FDG) that measures cellular glucose metabolism, and FAC (fluoroarabinofuranosyl cytosine), developed at the University of California, Los Angeles (UCLA; USA; [www.ucla.edu](http://www.ucla.edu)), and which measures the activity of a distinct biochemical pathway, work better when used in combination than either does alone. In addition to revealing the extent and cellular composition of an immune response, the probes also may be useful in evaluating therapies that target different cellular components of the immune system, according to Dr. Owen Witte, a UCLA professor of microbiology, immunology, and molecular genetics, and senior author of the study.

"We demonstrated with this study that each probe targets different cells in the immune system with a high degree of specificity," said Dr. Witte, director of the UCLA Broad Stem Cell Research Center. "When cells are activated to do their job as an immune cell, the FDG probe is good at recognizing the subset of activated macrophages, while the FAC probe is good at recognizing the activated lymphocytes, as well as the macrophages. When tested sequentially, the combined information from the scans using the two probes gives you a better status of immune response."

The study, with lead author Evan Nair-Gill, a student in the campus' Medical Scientist Training Program, was conducted on mice bearing virally induced sarcomas. The article was published May 18, 2010, in the early online edition of the *Journal of Clinical Investigation*. Testing the probes in humans is the next step.

The scans provide insights into how the immune system works, for example, in response to cancer or autoimmune diseases such as rheumatoid arthritis, inflammatory bowel disease, and multiple sclerosis, according to Dr. Witte. They also could be used to see how therapies, such as vaccines and monoclonal antibodies meant to stimulate an immune response, are functioning within the body of a patient. "This could give us another way to measure the efficacy of certain drugs," Dr. Witte said. "With some drugs, you could measure a change in the immune response within a week."

If the drugs are working, physicians could stay the course. If they

are not working or not working well enough, the therapy could be discontinued, sparing the patient a months-long exposure to an ineffective drug. The next step will be evaluating the two probes in humans with a range of diseases, including cancer and autoimmune disorders, to confirm the work.

Dr. Witte and his colleagues licensed the FAC probe to Sofie Biosciences (Culver City, CA, USA; [www.sofie-biosciences.com](http://www.sofie-biosciences.com)), which is owned in part by Dr. Witte and other UCLA faculty members. Researchers created the small molecule by slightly altering the molecular structure of one of the most commonly used chemotherapy drugs,

gemcitabine. They then added a radiolabel so the cells that take in the probe can be seen during PET scanning.

The probe measures the activity of an essential cell biochemical pathway called the DNA salvage pathway, which acts as a recycling mechanism that helps with DNA replication and repair. All cells use this biochemical pathway to different levels. However, in lymphocytes and macrophages that are proliferating during an immune response, the pathway is activated to very high levels. Because of that, the probe accumulates at high levels in those cells, reported Dr. Witte.

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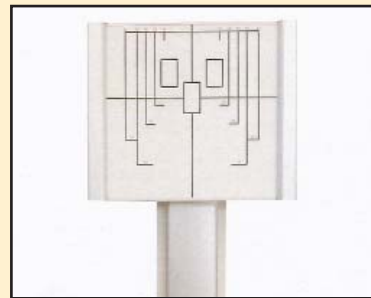
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## MRI SYSTEM Toshiba Medical Systems

The Vantage Titan 3T open-bore system includes noise-reduction technology, as well as a 71 cm opening for increased patient comfort and decreased claustrophobia. Other key benefits include Fresh Blood Imaging, CIA, Time-SLIP, and Time and Space Angiography (TSA).

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## VERTICAL BUCKY UNIT Arcom

The Dtr vertical bucky allows cassettes to be loaded from either side of the bucky. The stand weighs 120 kg, allows vertical movement from 400 mm to 1760 mm, and features three available image detectors.

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## Digital Radiography Detector Technology Improves Workflow and Image Quality in Europe

A growing number of healthcare providers across Europe are choosing to install an innovative wireless digital radiography (DR) system to solve workflow and productivity challenges. Since its introduction in 2009, the cost-effective price of this new technology and its ability to utilize existing X-ray systems has led to well over 200 units being successfully installed and operational across Europe.

The Carestream DRX-1 system is the industry's first wireless, cassette-size DR detector that can be employed in all applications where a 35 cm x 43 cm (14" x 17") X-ray cassette would be used. This means that it can be easily incorporated into all types of radiology environments, and it does not require modification of existing rooms. The DRX-1 system provides high quality preview images in about five seconds and its compact size and lightweight further enhance convenience and throughput.

Development of the system has also been recognized by leading global research company Frost & Sullivan (Palo Alto, CA, USA) with the presentation to Carestream Health (Rochester, NY, USA; [www.carestreamhealth.com](http://www.carestreamhealth.com)) of the 2010 Europe New Product Innovation Award in the Digital Radiography Market.

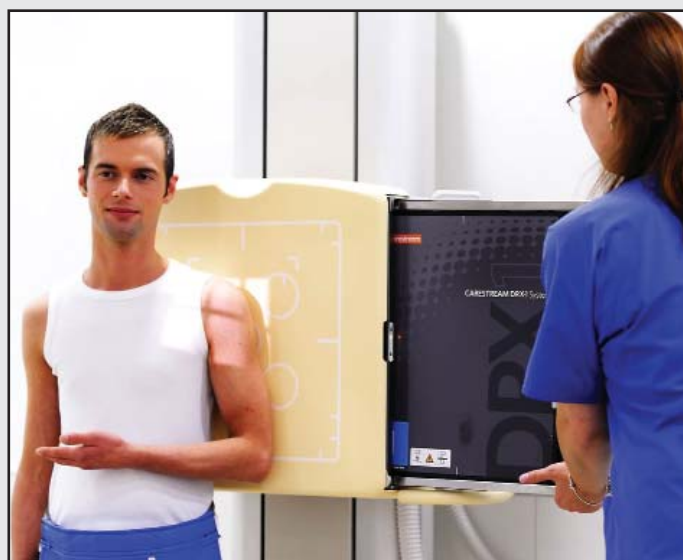
Dr. Günther Nics was the first radiologist in Austria to be convinced by the advantages of the DRX-1 system for his clinic in Hollabrunn, where the team of 12 staff and two physicians care for approximately 25,000 patients yearly, performing approximately 70,000 exams. Following the introduction of the DRX-1, imaging is now considerably faster and easier. "The fact that the cassette, the technologist and the patient are in contact with each other throughout the whole process, including checking the image, is a great step forward," said Dr. Nics.

A further advantage experienced by Dr. Nics

has been an improvement in image quality, "The resolution in the new system is definitely better," he added. Together with the new reader and processing software, we feel this represents a qualitative leap in image presentation."

Also in Austria, a DRX-1 has been installed in the Rudolf Foundation Clinic in Vienna, where it is used for examinations of the abdomen and urinary tract, urologic stone center, general internal and surgical imaging, as well as bedside lung and individual skeletal imaging. Dr. Dimitar Tscholakoff led the move towards the DRX-1 with the goal of prolonging the service life of existing systems while meeting the specific need to both improve workflow and maintain quality. "We opted for the DRX-1 in order to improve workflow and image quality and we have succeeded," Dr. Tscholakoff noted. "We have been able to increase productivity and shorten patient examination times for the benefit of all." In addition to enhancing quality, the DRX-1 system also has the advantage of shortening examination time from two minutes to 17 seconds, a particular benefit to patients from the intensive care unit.

The Centre Hospitalier de Decize is situated 30 km from Nevers in the Nièvre region of France, and the hospital has been operating a DRX-1 system for several months. Ms. Herzog-Prunet, medical technical manager of the radiology department, outlined the system's advantages. "All our radiology is digitized today, image quality has been improved and the patient dose reduced, but what is most impressive is the global increase in work, particularly in the orthopedic unit. The



DRX-1 has really boosted the number of examinations in this room, which is definitely down to not having to transport any cassettes but also to the previsualization function, which makes it possible to check the plate after just a few seconds. This saves precious time, particularly without a fluoroscope, and is a significant factor in improving patient comfort, something that is paramount for our patient recruitment which consists mainly of orthopedic examinations for elderly patients."

The ImaginX practice, owned by Dr. Hustinx, is located in Waterloo, near Brussels, and conducts approximately 250 examinations each week, one-third of which are mammograms. Installation of the DRX-1 has enabled Dr. Hustinx to optimize workflow, particularly with regard to the examinations carried out on the remote-controlled digitizer and mammography unit. The DRX-1 enabled transformation of the digitizer into a flat panel detector without any great investment enabling the CR reader to be moved to the mammography unit.

*Image: The DRX-1 digital radiography detector (Photo courtesy of Carestream Health).*



## PET and CT Colonography Combines to Bring Comfort to Patients

A new method that combines two imaging technologies detects polyps, but requires no sedatives or bowel preparation.

A study published in the June 2010 issue of the *Journal of Nuclear Medicine (JNM)* shows that positron emission tomography (PET) – a molecular imaging technique – combined with computer tomography (CT) colonography may provide a suitable alternative for detecting polyps and cancer in the colon. This particular imaging method may be especially desirable for patients because it does not require sedation or bowel preparation.

“One of the first indications of colorectal cancer is often the presence of polyps, which are abnormal tissue growths on the inner lining of the colon or large intestine,” said Stuart A. Taylor, M.D., University College London (UK; [www.ucl.ac.uk](http://www.ucl.ac.uk)), and lead researcher of the study. “If these polyps are detected noninvasively and without the use of bowel preparation and sedatives, investigation can be much easier on patients who would otherwise undergo colonoscopies.”

Up to now, the conventional diagnostic modality for colorectal cancer and polyps has been colonoscopy, whereby a telescopic camera is introduced into the colon via the back passage and passed around the one to two meters of colon to look for abnormalities in the bowel lin-

ing. Although this technique is very effective, it is also invasive and can be uncomfortable for patients. Currently, patients empty their bowels using laxatives, may require sedation during the test and may need to take a day off from their normal activities. Strong laxatives can also be harmful to older patients by causing dehydration and disturbing their salt levels.

CT colonography (CTC) is an imaging technique that presents a promising, less invasive alternative to colonoscopy. The CTC scan provides images of the lining of the bowel, which has been gently distended with gas, without the need for sedatives. One potential advantage of CTC over colonoscopy is its ability to visualize the large bowel – without the patient having to take strong laxatives. PET scanning produces images of the uptake of blood sugar (glucose) by body tissues. Because cancerous cells tend to take up more blood sugar than normal tissue, these concentrations provide clear evidence of any abnormalities.

This study researched the effectiveness of using a combination of CTC and PET scans without any bowel preparation to detect significant abnormalities in the colon. Although other work has demonstrated that combined PET CTC is technically feasible, most have required patients to undergo complete bowel preparation and only a small number of patients have been

studied. The current study is the largest to date investigating combined PET CTC in patients without any bowel preparation.

Fifty-six patients agreed to undergo a one-hour CTC and PET scan approximately two weeks before their scheduled colonoscopy. This was done without the use of laxatives. Patients were also asked to complete a questionnaire to see how they tolerated the tests and which ones they preferred.

The colonoscopy findings were then compared with the CTC scan on its own and with the CTC and PET scans combined. The study revealed that the combined PET CTC scans detected all the significant larger polyps found by the invasive colonoscopy technique. Moreover, most patients found the combined scan technique more comfortable and preferred it to colonoscopy.

“The work has shown that combined PET CTC is technically feasible, well tolerated by patients, and capable of achieving high diagnostic accuracy,” noted Dr. Taylor. “This test would be mainly used in patients less able to tolerate invasive investigations or the preparation required if physicians want to exclude any major pathology in the colon and abdomen.”

Colorectal cancer is one of the leading causes of cancer death in the Western world and affects approximately 6% of the population.

## SPECT/MRI Hybrid Prototype Looks Deep into Soft Tissues of the Brain

Research points to the possibility of a new hybrid molecular imaging system that uses single photon emission tomography (SPECT) and magnetic resonance technology (MR).

The new technology could provide a greater depth of data about a host of biologic processes and anatomic information including soft-tissue contrast, which is important for many diagnoses.

“By combining SPECT and MR imaging in a single scan, researchers can acquire fused images that provide meaningful information for brain studies, heart imaging and a range of other applications,” said Benjamin M. W. Tsui, Ph.D., lead researcher and professor of radiology at Johns Hopkins University (Baltimore, MD, USA; [www.jhu.edu](http://www.jhu.edu)). “Imaging the human brain using this technique could revolutionize diagnostic radiology and improve patient care.”

Earlier research has been conducted for the development of other hybrid molecular imaging systems that combine positron emission tomography (PET) and MR, but this is the first study evaluating the feasibility of a SPECT/MR system. The

introduction of MR to SPECT imaging not only adds useful anatomic and biochemic information, but it would also help to compensate for other image-degrading factors, such as photon attenuation and scatter, which can be present in SPECT imaging.

The researchers developed a fully MR-compatible, stationary ring-type SPECT prototype using cadmium zinc telluride (CZT) solid-state detector modules. All components used for the new preclinical SPECT system were entirely composed of nonferrous materials to avoid image artifacts that could otherwise occur within the magnetic field.

In this study, researchers did not have to rotate the SPECT component, but the imaging scanner was able to capture dynamic data using multiple projection views. The team also investigated image reconstruction methods that would best work with data acquired from the new imaging system. This study, according to the researchers, proves that SPECT/MR is a viable technology that could enhance the diagnostic capability of SPECT alone and provide additional information that

SPECT/CT cannot. Plans to extend the preclinical prototype to clinical brain SPECT/MR are underway and clinical trials are expected to begin within three or four years.

Dr. Tsui’s research group for this study was part of a collaboration that included the University of California, Irvine, and was led by

Gamma Medica-Ideas (Northridge, CA, USA) under the support of a U.S. National Institutes of Health (NIH) SBIR research grant.

The study’s findings were presented at the Society of Nuclear Medicine’s (SNM) 57th annual meeting, June 5-9, 2010, in Salt Lake City, UT, USA.



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### DR DETECTOR Canon

The CXDI-70C wireless detector features a large image area, same dimensions as ISO 4090 film cassettes, cable-free image transfer, and a lightweight size. The detector is designed to provide users with greater device portability, as well as enhanced image quality.

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### ANGIOGRAPHY SYSTEM WDM

The CGO-2100 cardiac/interventional system offers easy operation, secure design, high-resolution images, and digital imaging technology and networking system. The system is based on the Invaray platform, and provides accurate imaging for faster diagnosis and treatment.

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### DIGITAL STAND Control-X Medical

The Z-motion stand is fully motorized and counter-balanced, and for quick changes, the stand can be easily positioned in seconds manually when releasing the brakes. The stand is designed for practitioners to employ digital flat panel technology.

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## Ultrasound Technology Provides Greater Insights for Pediatrics

With intuitive controls and a wide range of transducers, a new point-of-care ultrasound system offers anesthetists easy access to ultrasound guidance for line placement and regional nerve blocks. The pediatric anesthetics department at Leeds General Infirmary (UK; [www.leedsteachinghospitals.com](http://www.leedsteachinghospitals.com)) has taken advantage of this user-friendly instrument to ensure accurate and safe regional anesthesia, as well as post-surgery multimodal analgesia. Consultant pediatric anesthetist Dr. Duncan Johnson explained, "Ultrasound guidance is of particular benefit to pediatric specialties, as the anatomy of a premature infant has little in common with that of a 17-year-old. Use of ultrasound to guide nerve blocks offers an easy route to safer, more reliable blocks, enabling the anesthetist to visualize the needle adjacent to the nerve, while avoiding other important structures."

"Leeds is a national referral center for hand surgery, specializing in transplants and improv-

ing motor function for children with congenital abnormalities. These procedures are generally performed in very young children, and effective nerve blocks can be difficult to achieve, due to a combination of their small size and atypical anatomy. Ultrasound guidance is very helpful in these patients, and the small footprint of the S-Nerve's hockey stick probe is very well suited to this application. The anesthesia-focused controls of the instrument make it very quick and easy to operate during procedures, obtaining good quality images with a minimum of adjustments."

The S-Nerve ultrasound system was developed by SonoSite, Inc. (Bothell, WA, USA; [www.sonosite.com](http://www.sonosite.com)). SonoSite is a developer of hand-carried ultrasound. The company's small, lightweight systems are expanding the use of ultrasound across the clinical spectrum by cost-effectively bringing high performance ultrasound to the point of patient care.



Image: The S-Nerve ultrasound system (Photo courtesy of SonoSite).

## Decision-Support System Nets Fewer Unnecessary Imaging Exams for Patients

A new rule preventing medical support staff from completing orders for outpatient imaging exams that were likely to be negative resulted in a noticeable decrease in low-yield exams for patients.

Many medical institutions request and schedule outpatient diagnostic imaging exams through use of web-based radiology order entry systems. Some systems offer real-time feedback, called decision support, on the appropriateness of the exams being ordered. When entering the desired examination into the system, the physician or support staff must also enter clinical information justifying the order. Based on that information, the decision-support system provides a yield score ranging from one to nine. The score indicates the probability that the selected exam will yield valuable diagnostic or positive results for this set of clinical circumstances.

Following American College of Radiology (Reston,

VA, USA) appropriateness criteria, a score of one to three is considered low yield. The user is then given the opportunity to cancel the order or select a different examination. However, because medical support staff do not make clinical decisions, they are less likely to cancel or revise an order without additional clarification from the physician.

To address this problem, Massachusetts General Hospital (MGH; Boston, MA, USA; [www.mgh.harvard.edu](http://www.mgh.harvard.edu)) instituted a rule preventing medical support staff from completing computerized orders for outpatient computed tomography (CT), magnetic resonance imaging (MRI), and nuclear medicine examinations that received low-yield decision support scores.

"We developed this strategy to encourage more clinician 'hands-on' use of the system," said Vartan M. Vartanians, M.D., clinical research associate in the

department of radiology at Massachusetts General Hospital. "With greater physician involvement, fewer low-yield exams are ordered."

After the change, the proportion of total examination requests by physicians directly logging into the system more than doubled from 26% - 54% of the total number of requests, while the percentage of low-yield exams requested decreased from 5.4% of total number of requests to 1.9% of total requests.

"Physicians need to use the decision-support system for it to be effective, but getting them to do so can be difficult," Dr. Vartanians said. "Our work demonstrates that a minimally disruptive alteration in the radiology order entry system can encourage direct physician involvement, and improve patient care by reducing the number of low-yield examinations."

The study was published June 2010 issue of the journal *Radiology*.



## New Molecular Imaging Biomarker Effectively Demonstrates Malignant Prostate Tumors

Thomas Jefferson University (Philadelphia, PA, USA; [www.jefferson.edu](http://www.jefferson.edu)) and NuView Life Sciences (Park City, UT, USA; [www.nuviewinfo.com](http://www.nuviewinfo.com)) have entered into an exclusive licensing agreement for advancing the development of a new molecular imaging (MI) compound that identifies genomic expressions linked to prostate cancer (PC).

"The prostate compound developed at Thomas Jefferson University may provide a noninvasive early and more accurate imaging technique to (a) localize primary PC, that will guide biopsy; (b) detect recurrent disease; (c) image metastatic disease; and (d) determine effectiveness of treatment," said Dr. Mathew Thakur, professor of radiology and director and lead investigator. Developments in genomics and proteomics have shed light on the genesis of many diseases, including PC. PC cells express oncogene product VPAC1 exogenously in a large number. These specific fingerprints express themselves at a very early stage, well before cell morphology has altered for histologic confirmation, and even well before the elevation of PSA [prostate-specific anti-

gen]. We hypothesize that targeting elevated VPAC1 with gene-guided radioactive probe for molecular imaging of PC will permit us to contribute toward this need. During the past 10 years, the Thakur laboratory at Thomas Jefferson University has gained extensive experience in successfully targeting these biomarkers with Tc-99m or Cu-64 labeled specific peptides, for early and accurate diagnosis of pancreatic and breast cancers in animals as well as in humans by planar, SPECT [single photon emission tomography] and PET [positron emission tomography] imaging. The early data for PET imaging of PC by Cu-64-peptide are highly encouraging," said Dr. Thakur.

Among men in the United States, PC is the most deadly disease, second only to the cancers of the lung and bronchus combined. Statistical data indicate that PC affects one male in every six who are older than 60 years of age and the risk continues to rise as life expectancy increases. Although great advances have been made in the diagnosis and treatment of PC, 29,500 men succumbed to PC in 2007 alone. Early diagnosis of PC can necessitate

aggressive therapeutic intervention; greatly improve the management of disease, and save patients from morbidity and mortality. Two prominent diagnostic tests for PC, namely the determination of PSA and the transrectal ultrasound (TRUS), suffer from serious limitations and require invasive systemic biopsy for histologic confirmation, considered to be the gold standard. In 2007, an estimated 750,000 prostate biopsies were performed, more than two-thirds of which had benign pathology, leading to a major ineffectiveness. Inaccurate or unreliable diagnosis results in under-, or over-treatment of patients leading to minimal benefits, incontinence, and/or impotence and significant loss of health care resources.

NuView CEO Paul Crowe, said, "The benefits from this MI biomarker are clear. If potentially terminal conditions such as prostate cancer can be accurately detected before manifesting into a structural change, patient outcomes would greatly improve, and healthcare costs would decline. MI is noninvasive,

so the need for exploratory surgery would also be reduced, and MI can be used to track the progress and response from drug therapies or other treatments, enabling the physician to monitor and quickly respond to their patient's condition."

NuView medical director Peter Conti, M.D. added, "This development of genomics-based molecular imaging diagnostics is very promising and may, with alterations to the biomarkers original complex, become a companion or paired targeted therapeutic. The potential for pairing a molecular diagnostic and a targeted therapy based on the individual patient characteristics, will contribute to the growing trend towards more efficient personalized medicine. We are pleased to part of this new frontier in medicine that should provide physicians with new approaches for diagnosis and treatment of medical disorders." Dr. Conti is a professor of biomedical engineering, radiology, and pharmacy at the University Of Southern California (Los Angeles, USA).

## Ultrasound Characteristics May Eliminate the Need for Some Minimally-Invasive Thyroid Biopsies


Instead of referring patients for ultrasound-guided biopsies, physicians may now be able to rely on specific conventional ultrasound characteristics to determine the pathology of some thyroid nodules, according to recent findings.

"Thyroid nodules affect more than 50% of the population, and statistically more than 85% of them are incidental and benign," said Barry Sacks, M.D., lead author of the study. "Unfortunately, this means millions of patients are undergoing unnecessary biopsies as doctors are finding a very low number of cancers. This is an enormous cost burden and provokes a lot of unnecessary anxiety for patients," said Dr. Sacks. "The purpose of our study, performed at MetroWest Medical Center in Natick, MA [USA; [www.mwmc.com](http://www.mwmc.com)], and Beth Israel Deaconess Medical Center in Boston, MA [USA; [www.bidmc.org](http://www.bidmc.org)], was to determine whether conventional ultrasound alone could predict a spe-

cific nodule type – aiding differentiation between benign and malignant thyroid nodules," he said.

The study findings were presented May 5, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting in San Diego, CA, USA.

"Specifically, we reviewed the accuracy of conventional ultrasound comparing it to the final pathology determined by ultrasound-guided biopsy," said Dr. Sacks. Of the predicted benign lesions, ultrasound prediction was correct in 89% of the benign cases. Of the lesions that were highly suspicious for malignancy, ultrasound prediction was correct in 94% of the cases. Our data suggest that subsequent triage of some thyroid nodules may be able to be performed solely by ultrasound appearance which will allow us to dramatically reduce the number of unnecessary thyroid nodule biopsies performed," concluded Dr. Sacks.




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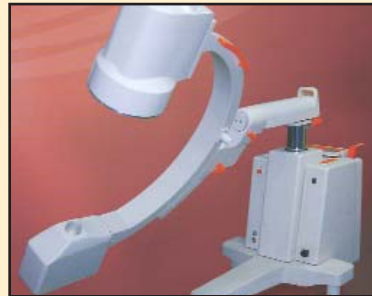
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## DIAGNOSTIC X-RAY SYSTEM DRGEM

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## C-ARM X-RAY SYSTEM EcoRay

The ECO-CX9 features a compact and ergonomic design, enhanced image performance, easy handling, and safe operation. The system also offers auto brightness control, pulsed fluoro mode for dose reduction, and dual flat panel monitors on the cart and LIH.

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## DR SYSTEM IMIX

The RadStation transportable DR system can be moved and connected to any existing radiography system to deliver immediate imaging. Key features include intuitive interface technology and generator quick connects, that allow full digital capability without modifications.

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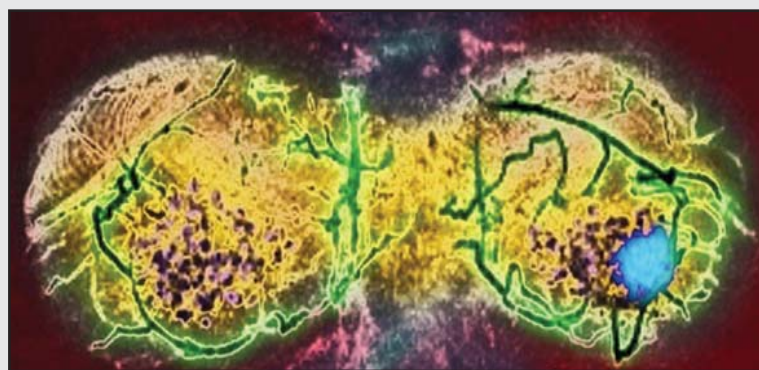
## Breast Cancer Staging Recommended to Include Breast MRI

**B**reast magnetic resonance imaging (MRI) can detect lesions missed on mammography and ultrasound and help surgeons plan the most appropriate surgical treatment, improving patient outcomes, according to recent research.

Breast MRI offers valuable data about many breast conditions that cannot be obtained by other imaging modalities, such as mammography or ultrasound. As a result, it is increasingly being used for the pre-operative evaluation of patients with newly diagnosed breast cancer.

The study, performed at the

University of Rome "La Sapienza" (Italy; [www.uniroma1.it](http://www.uniroma1.it)), included 164 women with biopsy-proven breast cancer. Researchers examined how breast MRI influenced the surgical management choices of those patients. "Breast MRI changed the therapeutic procedure previously proposed based on conventional imaging [mammography and ultrasound] for 32/164 patients," said Valeria Dominelli, M.D, lead author of the study. "Breast MRI also detected 51 additional suspicious lesions not seen on mammography or ultrasound. Breast MRI positively



affects patient management decisions and should be recommended for mapping tumor extent in patients with newly diagnosed breast cancer. The correct assessment of the disease can help the surgeon plan the most appropriate surgical treatment, possibly reducing the need for reintervention."

The study was presented May 3, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting, held in San Diego, CA, USA.

*Image: Colored magnetic resonance imaging (MRI) scan of a coronal section through breasts of a 53-year-old woman, showing cancer (blue) (Photo courtesy of Simon Fraser / SPL).*

## Medical Directive Initiated to Reduce Energy Use of Ultrasound Technology

**A** leading medical device company announced a commitment to reduce the average energy consumption of new ultrasound products by 25% by 2012 (based on 2005 performance results), in line with a new directive initiative.

With support from the European Union (EU) Commission, GE Healthcare (Chalfont St. Giles, UK; [www.gehealthcare.com](http://www.gehealthcare.com)), a business unit of General Electric Co. (Fairfield, CT, USA), and a group of 10 other medical device manufacturers within the European Coordination Committee of the Radiological, Electromedical, and Healthcare IT Information technology Industry (COCIR; Brussels, Belgium; [www.cocir.org](http://www.cocir.org)), have proactively committed to a self-regulatory initiative for the energy-efficient design of medical imaging equipment.

"GE Healthcare welcomes the support of the European Union Commission for this initiative," said Mike Harsh, vice president and chief technology officer of GE Healthcare. "This announcement paves the way for GE Healthcare, our customers,

and the environment to benefit from improvements in energy efficiency. We see this as a terrific opportunity to demonstrate the innovation of the company's technology development and furthermore improve the access to and the quality of healthcare products all over the world."

The Energy-Related Products (ErPs) Directive establishes a framework for setting resource efficiency standards by product platform and increasing focus on the life cycle of the product. For products identified to be in scope, thorough enforcement measurements will also be put in place by the government to ensure that stringent requirements are met and environmental improvements are achieved before a product is commercialized.

"COCIR and the member companies fully support the ErP Directive to proactively reduce and optimize energy consumption and is seen as the leader in the field of environment and at the forefront of green initiatives with intelligent EcoDesign solutions," said Nicole Denjoy, COCIR secretary general.

This decision coincides with the five-year anniversary of GE's ecomagination initiative to imagine and build innovative technologies that help customers address their environmental and financial needs, such as the need for cleaner, more efficient sources of energy. Over the past five years, GE has added over 80 products to its ecomagination range including digital X-ray, high efficiency magnetic resonance imaging (MRI) technology, lower cost, high quality computed tomography (CT), and advanced ultrasound products.

"We're excited to work together with COCIR to make a difference in medical devices. The new generation of medical devices can help save impressive power consumption throughout the industry," said Reinaldo Garcia, president and CEO of GE Healthcare for Europe, Middle East, and Africa (EMEA).

Ultrasound will be the first product area implementing the regulation. Additional modalities will implement self-regulation each year.



## Lensless Imaging of Whole Biologic Cells Developed Utilizing Soft X-Rays

Scientists are utilizing X-ray diffraction microscopy to generate images of whole yeast cells, achieving the highest resolution – 11 nm - 13 nm – the first ever obtained with this method for biologic specimens. Their success indicates that full three-dimensional (3D) tomography of whole cells at an equivalent resolution should soon be possible.

The team of scientists is working on their project at beamline 9.0.1 of the Advanced Light Source (ALS) at the U.S. Department of Energy's (DOE) Lawrence Berkeley National Laboratory (Berkeley, CA, USA; [www.lbl.gov](http://www.lbl.gov)). "We have demonstrated that lensless imaging techniques can achieve very high resolution while overcoming the limitations of X-ray optics – limitations that include requiring 20 to 50 times the radiation exposure to get a magnified image of the sample," said Dr. Chris Jacobsen, formerly of Stony Brook University (Stony Brook, NY, USA), now of Argonne National Laboratory (Argonne, IL, USA) and Northwestern University (Evanston, IL, USA), who designed the lensless-imaging research program at beamline 9.0.1. "While at present it takes us a long time to image a single specimen – and full 3D imaging of hydrated cells will take even more work – this is a big step in the right direction."

Three-dimensional imaging of whole cells under conditions close to those in nature, specifically a hydrated (watery) environment, was already achieved at the U.S. National Center for X-Ray Tomography at ALS beamline 2.1, under the direction of Dr. Carolyn Larabell of Berkeley Lab's physical biosciences division, where large numbers of cells can be processed in a short time at resolutions of 40 nm - 60 nm. The ability to increase resolution to the 10-nm range would considerably advance research in both biology and materials sciences. "Ten-nanometer resolution is easy to achieve with an electron microscope," said Janos Kirz of the ALS, codesigner with Dr. Jacobsen of the lensless-imaging program. "The problem is that electron microscopy is limited to very thin samples, a few hundred nanometers or less – so you can't use it to look through a whole cell."

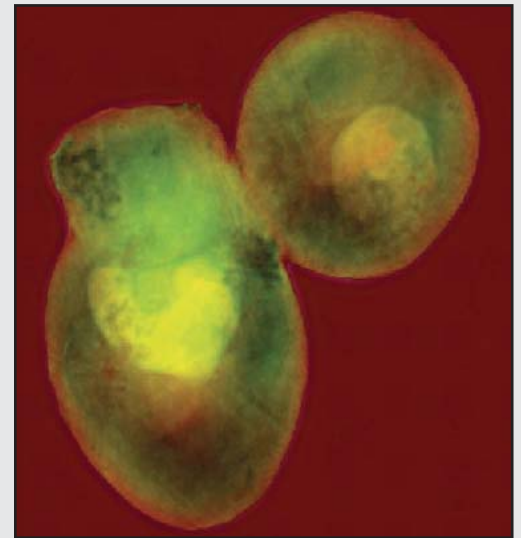
Whereas X-rays have the ability to look deep into thick specimens, or right through them, imaging with a lens has its own difficulties. Even the best X-ray microscope lenses (concentric circles of metal known as Fresnel zone plates), cannot focus X-rays with high efficiency, so to get an image means using such intense radiation that it more quickly damages biological specimens. At the same time, the geometry of the highest-resolution zone plates makes for an extremely narrow depth of focus.

To get around these hurdles, a research team led by Dr. Jacobsen's students Johanna Nelson, Xiaojing Huang, and Jan Steinbrener – also of Stony Brook – utilized a lensless X-ray diffraction microscopy. To produce a high-resolution diffraction pattern from noncrystalline structures such as the membranes and organelles of a cell, the light has to be coherent, meaning, laser-like, having all the same frequency and phase. Beamline 9.0.1 was built to supply this kind of light.

As the scientists proceed through the cell, the coherent X-rays are scattered and differentially absorbed by the cell's internal structures. There is no lens either in front or behind the sample as the light passes through the cell and reaches the detector, so there is nothing to limit resolution or efficiency. However, the result looks nothing like an image. Instead, it is a pattern of dark and light speckles, the traces of the scattered X-rays. A computer, which acts as the "lens" in lensless imaging, uses these patterns to create an image. Dr. Stefano Marchesini, ALS beamline scientist for beamline 9.0.1, remarked, "The challenge of the lensless technique is that essentially the preparation and quality of the sample have to be perfect – and, ideally, completely isolated in the beam."

The principle cannot be reached in reality, since the sample has to be supported. Furthermore, to image hydrated cells, the specimen has to be frozen, which introduces misleading data from the presence of ice. In November 2009, Dr. Jacobsen's team utilized the beamline 9.0.1 to image a frozen, fully hydrated yeast cell at a resolution of 25 nm – a resolution limited by ice. The current experiment's 10 nm - 13 nm resolution required using unhydrated, freeze-dried cells at room temperature.

Until recently, to produce an image, researchers had to know the precise shape of the sample's support and have a pretty good idea of the shape of the sample itself, before the computer could even start solving the diffraction patterns. A new algorithm written by Dr. Marchesini called "shrinkwrap" converges on the diffraction data through subsequent iterations, and finally differentiates and subtracts the support from the sample image.



The relationship of a cell's internal structures can only be determined accurately by full 3D tomography. In a 2D image, these features are stacked one on top of another, and separating the planes is partly a matter of conjecture. Short of true 3D, it is possible to gain some sense of how the internal structures are arranged by focusing on different depths in the structure, then comparing these images with others of the same object made with different techniques.

*Image: A pair of yeast cells imaged at very high resolution using coherent soft X-rays at the Advanced Light Source's beamline 9.0.1. The coherent (laser-like) beam of penetrating X-rays allows a computer to reconstruct the cells' internal structures from a diffraction pattern, without focusing the light with a lens (Photo courtesy of the Lawrence Berkeley National Laboratory).*

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## MRI SYSTEM Paramed Medical Systems

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## PORTABLE DR SYSTEM Reliant Medical Systems

The Eros DR system offers a wide grayscale range, allowing for easy adjustment of brightness and contrast for a more accurate diagnosis. The system is comprised of a case, laptop, and digital detector, all designed with various features.

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## FILM ILLUMINATOR Point A Technologies

The Vista illuminator features a slim design, as well as enhanced luminance by LCDTV technology. Key benefits include an average uniformity of over 90%, a built-in power supply, and a lamp life of approximately 50,000 hours.

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## First Mobile 3.0T MRI with Multitransmission Capabilities

A new mobile magnetic resonance imaging (MRI) system is designed to improve patient access to multitransmitting medical imaging technology.

Philips Healthcare (Best, The Netherlands; [www.medical.philips.com](http://www.medical.philips.com)) introduced the world's first mobile 3.0T MRI system with MultiTransmit – the Achieva 3.0T TX Mobile MRI. The medical charity, Cobalt (Cheltenham, Gloucester, UK; [www.cobaltappeal.com](http://www.cobaltappeal.com)), purchased the first system and teamed up with Philips to present the Achieva 3.0T TX Mobile MRI in its mobile trailer at the Radiological Conference (UKRC; Birmingham, UK) on June 7-9, 2010, becoming the first to operate the 3.0T MRI system in Europe with MultiTransmit.

Built with the same imaging technology as the stationary Philips 3.0T TX system and outfitted with the same amenities and staff as an in-house MRI suite, the Achieva 3.0T TX Mobile is fully transportable in a 14.6-meter trailer. "The beauty of Achieva 3.0T TX Mobile is that several differ-

ent healthcare facilities can rent it at any given time because of its ability to travel, ultimately helping to solve patient overflow issues in large university and teaching hospitals," said Conrad Smits, CEO for MRI, Philips Healthcare. "In addition, it is also ideal for healthcare facilities who do not have the resources to build or add onto their own MRI suites or who want to sample the imaging service provided by advanced 3.0T MultiTransmit technology."

Additionally, the Achieva 3.0T TX Mobile has the same ease of use and set-up time as many 1.5T scanners, but with the higher resolution and clarity that was once only available in advanced research institutions. The mobile unit also includes active magnetic shielding, permitting the lightweight high field magnet to be transported in the trailer.

The system features MultiTransmit, Philips' patient-adaptive parallel transmit radiofrequency (RF) technology, which utilizes multiple radiofrequency transmission signals to automatically

adjust to each patient's unique size and shape. Previously, radiologists using 3.0T imaging faced the challenge of dielectric shading, a nonuniform radiofrequency distribution in the body that affected image quality. The Philips MultiTransmit technology innovation delivers enhanced image contrast uniformity, and consistent 3.0T imaging to mainstream radiology.

Cobalt, the first to own a Philips Achieva 3.0T TX Mobile, is a leading medical charity. One of their many aims is to facilitate screening for cancer operating within the three counties of Gloucestershire, Worcestershire, and Herefordshire. Peter Sharpe, CEO of UK medical charity Cobalt, said, "We believe that the system's greater field of view and excellent image uniformity provided by MultiTransmit technology will allow us to expand the range of patients for whom we can provide a 3.0T imaging service. It should also enable us to offer a regular service for standard MR referrals, not only providing higher quality images but also greater patient throughput."

## New MR Techniques Shows Blood Flows Differently Through Brains of Schizophrenics

Researchers in Germany have used a magnetic resonance imaging (MRI) technique called continuous arterial spin labeling (CASL) to map cerebral blood flow patterns in schizophrenic patients quickly and without using radiation or contrast agents.

The researchers' findings were published in the online edition and July 2010 issue of the journal *Radiology*. "Arterial spin labeling is a powerful technique that can help reduce the cost and complexity of examinations," said the study's lead author, Lukas Scheef, M.D., from the department of radiology at the University of Bonn (Germany; [www3.uni-bonn.de](http://www3.uni-bonn.de)). "It can also be more readily repeated than methods that involve the use of contrast agents and radiotracers."

Schizophrenia is a chronic and severe brain disorder that affects approximately 2.4 million American adults, according to the U.S. National

Institute of Mental Health (Bethesda, MD, USA). Symptoms can include hallucinations, delusions, disordered thinking, movement disorders, social withdrawal, and cognitive deficits.

In the study, conducted at the University Hospital of Bonn, researchers utilized CASL MRI to compare cerebral blood flow in 11 nonmedicated patients with schizophrenia and 25 healthy controls. The patient group included three women with a mean age of 36 years and eight men with a mean age of 32 years. The control group included 13 women (mean age, 29 years) and 12 men (mean age, 30 years).

The study's findings revealed that compared to the healthy controls, the schizophrenic patients had extensive areas of hypoperfusion, or lower blood flow than normal in the frontal lobes and frontal cortex, anterior and medial cingulate gyri, and parietal lobes. These regions are associated with a number of

higher cognitive functions including planning, decision-making, judgment, and impulse control.

Hyperperfusion, or increased blood flow, was observed in the cerebellum, brainstem, and thalamus of the schizophrenic patients. "Our CASL study revealed patterns of hypo- and hyperperfusion similar to the perfusion patterns observed in positron emission tomography [PET] and single photon emission computed tomography [SPECT] studies of schizophrenic patients," Dr. Scheef said.

Unlike PET and SPECT scanning, CASL MR images can be rapidly acquired without the use of ionizing radiation or contrast agents. In CASL MRI, arterial blood water is magnetically labeled in order to measure cerebral blood flow noninvasively. "CASL MRI may allow researchers to gain a better understanding of schizophrenia," Dr. Scheef concluded. "In the long run, it may help to individualize and optimize treatment."



## Risks with Abdominal/Pelvic CT Scans in Younger Patients

In younger patients, the estimated radiation risks associated with abdominal and pelvic computed tomography (CT) scans are twice those of older patients, according to recent findings.

"Estimating the risks associated with ionizing radiation is complex," said James Koonce, M.D., lead author of the study. "Many variables such as patient size, age, and the region of the body being imaged all effect the total risk. Our study looked at how the overall risks associated with abdominal/pelvic CT scans depend on patient sex and age," stated Dr. Koonce.

The study, performed at the Medical University of South Carolina (Charleston, SC, USA; [www.musc.edu](http://www.musc.edu)) included 51 patients who underwent routine contrast-enhanced abdominal and pelvic CT examinations. "We found that the estimated radiation risk for a 31-year-old [0.91 per 1,000] was about double that for a 74-year-old [0.47 per 1,000]. The median radiation risk to 25 males was 0.61 per 1,000 and for 26 females was 0.74 per 1,000," said Dr. Koonce.

The study was presented May 3, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting, held in San Diego, CA, USA.



"Clinicians ordering imaging tests must use their best clinical judgment to select patients with a reasonable pre-test probability that the diagnosis afforded by CT will give valuable information to effect patient management. Knowing the risk involved with radiation exposure to a patient during an abdominal/pelvic CT allows for more accurate risk benefit evaluation when a physician is deciding whether or not to order an exam," concluded Dr. Koonce.

*Image: False-color computed tomography (CT) X-ray scan through the human abdomen, showing the liver (left) and spleen (right) (Photo courtesy of CNRI / SPL).*

## Standard Phantom Designed for Calibrating MRI Machines

The first phantom for calibrating magnetic resonance imaging (MRI) machines has been developed that is traceable to standardized values.

MRI, a widely used medical application that relies on magnetic fields and radiowaves to visualize the body's internal structures, particularly soft tissues, may soon become even more useful. The U.S. National Institute of Standards and Technology (NIST; Gaithersburg, MD, USA; [www.nist.gov](http://www.nist.gov)) has unveiled the prototype, named Phannie, which was developed in collaboration with the standards committee of the International Society for Magnetic Resonance in Medicine (ISMRM; Berkeley, CA, USA; [www.ismrm.org](http://www.ismrm.org)).

Traceable MRI calibrations are expected to enable accurate, quantitative measurements of tumors and other disease markers that can be reproduced across many different patients, scanners, and clinics over time and potentially reduce medical costs.

Displayed at the annual ISMRM meeting held in Stockholm, Sweden, in May 2010, the NIST phantom is a plastic sphere about the size of a person's head, filled with water-bathed grids of 100 small plastic spheres containing various salt solutions that become magnetized in a magnetic field. By making MRI scans of Phannie, users can evaluate the image contrast, resolution, and accuracy of distance and volume measurements. A machine's performance can be compared to standards, to other MRI machines, and to itself over time.

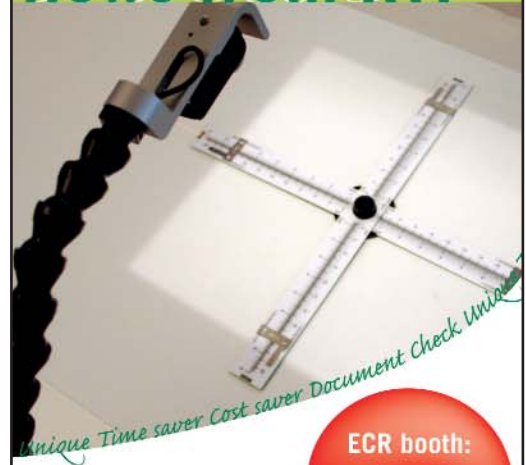
MRI scanner performance may drift, or different machines may produce different images of the same patient. The new phantom is intended to help generate more accurate and consistent images, val-

idate disease mechanisms and treatments, and reduce medical costs by improving image quality and effectiveness. The phantom will assist multisite clinical trials that use quantitative MRI to test the efficacy of novel drugs.

A number of specialized MRI phantoms already exist; the need for new ones to support quantitative studies was recognized at a NIST workshop in 2006. NIST's is the first phantom designed to ensure that MRI system properties and image data are traceable to international system of units (SI) standards. The ISMRM Ad Hoc Committee on Standards for Quantitative MR defined the phantom requirements and values. NIST modeled and built the prototype device and assured the accuracy of measured quantities. NIST also developed and tested various systems used in the minispheres as contrast-enhancing agents and measurement reference markers. Phannie will now undergo testing at other institutions for about four months.

Dr. Stephen Russek, the physicist leading NIST's part of the project, reported that the phantom is intended to be not only accurate and traceable but also physically stable and cost-effective, so that it can become as widely used in MRI machines as seatbelts are in cars. He demonstrated the durability of the mini-spheres by bouncing one on the floor. Materials for Phannie cost US\$10,000, but in mass production, the cost per phantom could be reduced to \$2,000. "If it's accurate, reliable, and affordable, then you have a way to measure the accuracy of MRI scanners all across the country," Dr. Russek stated. "If used routinely, it will allow us to get a complete snapshot of the quality and consistency of scanning."

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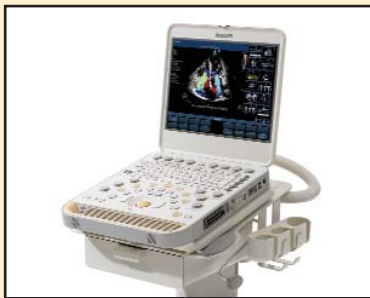
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### POC ULTRASOUND SYSTEM Philips Healthcare

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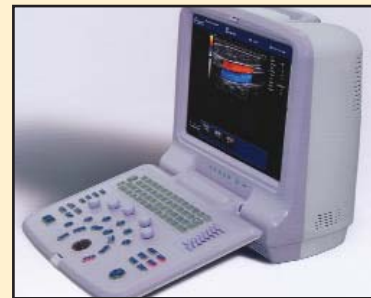
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### DR SYSTEM Carestream Health

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### COLOR DOPPLER SYSTEM Zhongjia Medical Technology

The AFS-3000 portable system features a powerful workflow that helps users record measurements, and save images easily. The system is designed for multiple imaging applications including abdomen, ob/gyn, small parts, urology, and cardiology.

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## Ultrasound System Has EMR Connectivity

A new ultrasound system is available with or without three-dimensional (3D)/4D imaging and is released with a full range of application-specific probes and software, customizable reports, and network/electronic medical record (EMR)-connectivity capabilities. Aloka Co., Ltd., (Tokyo, Japan; [www.aloka.com](http://www.aloka.com)) announced that its new, full featured, compact ultrasound system, the ProSound Alpha 6, will make its U.S. debut at the American Congress of Obstetricians and Gynecologists (ACOG) annual clinical meeting, May 15-19, 2010, in San Francisco (CA, USA). The ProSound Alpha 6 combines unprecedented performance and ease of use with an award winning ergonomic design for the ob/gyn, general imaging, and urology office markets. Building upon the technology of the high performance ProSound Alpha 10 and Alpha 7, the ProSound Alpha 6's high power processor allows a number of different imaging modes previously seen only in high-end systems.

This latest addition to the ProSound Alpha

series was awarded the 2010 International Forum (iF) Product Design Award and was designed to streamline workflow and to be user- and patient-friendly. Its compact, ergonomic design boasts a large, programmable touch screen for quick access to frequently used controls. The ProSound Alpha 6 is mobile, economic, and environmentally friendly, with reduced power consumption.

"We are extremely proud to launch the ProSound Alpha 6 in the United States," said David Famiglietti, chief operating officer for Aloka America, Ltd. "The compact and versatile ProSound Alpha 6, with its high performance/cost ratio, is a sound economic investment for your practice."

Aloka's ProSound Alpha series has a well-established reputation in large facilities and hospital imaging departments worldwide. The systems are fully functional in all work environments from research to ultrasound departments to private practices. Shipments of the new ProSound Alpha 6 began in the United States in May 2010.



Image: The ProSound Alpha 6 ultrasound system (Photo courtesy of Aloka).

## Contrast-Enhanced 3D Ultrasound Used for Differentiating Focal Liver Lesions

A contrast-enhanced (CE) ultrasound (US) appeared as an important modality to show the vascularity in the areas of interest, and it has been used widely in clinical diagnosis of liver lesions. Three-dimensional ultrasonography (3D US) allows three orthogonal planes to spatially demonstrate the features of subjects, which has been frequently used in fetal US.

Different from the 2D images, CE 3D US acquires the data in a volume of interest (VOI) by automatically scanning with a desired angle and allows reconstruction of tomographic images in three orthogonal planes and renders angiogram-like images. The combination of 3D US and CE US can present the enhancement of lesions in three dimensions and also in parallel slices by multiple-planar visualization. Although many studies on differentiation among various focal liver tumors have been conducted using CE 2D US, and recently a few

using CE 2D US with Sonazoid, the exact value of CE 3D US with Sonazoid in the differential diagnosis of various focal liver tumors has not yet been clarified. Sonazoid is manufactured by Nycomed Amersham Imaging (Princeton, NJ, USA).

A research article published in the May 7, 2010, issue of the *World Journal of Gastroenterology* addresses this question. The researchers, from the Gastroenterological Center, Yokohama City University Medical Center (Japan; [www.urahp.yokohama-cu.ac.jp](http://www.urahp.yokohama-cu.ac.jp)), retrospectively assessed tumor enhancement patterns, and the diagnostic criteria established using dominant enhancement patterns were then applied to differentiation among focal liver tumors in a prospective study.

In the study, with analysis of the combination of the enhancement in three phases at CE 3D US, the dominant patterns were used as the diagnostic criteria for individual category, and prospective

differentiation yielded a good sensitivity, specificity, high  $A_z$  value, and good to excellent inter-reader agreement, which revealed the potential usage of CE 3D US in differentiating various focal liver lesions. Although there were no significant differences between the prospective diagnosis at CE 3D US and that at CE 2D US, CE 3D US created a spatial and easily understood view for both hemodynamic and morphologic evaluation of focal liver tumors, which were formed only in the physicians' imagination by 2D imaging using complex acquisition methods.

The good to excellent inter-reader agreement in the investigators' previous study about CE 3D US demonstrating characteristic enhancement of hepatocellular carcinomas (HCCs) have indicated, according to the investigators, CE 3D US can exhibit the characteristic enhancement of HCC tumors objectively.



## Filters Improve Image Quality, Lower Patient Radiation Dose Tied to CT Scans

Adaptive image filters have been found to lower the patient radiation associated with chest and abdominal computed tomography (CT) scans while considerably improving image quality.

The research was presented May 3, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting in San Diego, CA, USA. Image filters are one of the tools used in image processing to lower image "noise" in low radiation dose CT. "As we lower the radiation dose, the CT images become 'noisy' or speckled, which makes it difficult to view the organs or the body structures in the image," said Sarabjeet Singh, M.D., lead author of the study. "Image filters allow us to effectively lower the radiation dose without sacrificing the image clarity."

The study, performed at Massachusetts General Hospital (Boston, MA, USA; [www.mgh.harvard.edu](http://www.mgh.harvard.edu)), included 12 patients who received a CT scan at four different levels of radiation dose in the chest and abdomen. All low dose images were processed with

adaptive filters, and "regardless of radiation dose, postprocessing with image filters improved subjective noise for both chest and abdominal CT and helped lower the CT radiation dose levels for chest by up to 40 mA and for the abdominal CT by up to 100 mA," said Dr. Singh. "With the increasing use of CT, radiation dose concerns have been rising in the medical community, patients, as well as the media. Hence various efforts have been made to lower the radiation dose associated with CT scanning."

The research was presented May 3, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting in San Diego, CA, USA.

"There are many ways to lower patient radiation dose associated with CT scans. However, the filters are one of the simpler ways of reducing radiation dose with CT. They only require a selection of preset settings that can be applied automatically to improve image quality and thus enable lowering of the radiation dose," concluded Dr. Singh.



Image: False color computed X-ray tomography (CT) scan of the chest of a healthy woman aged 28 years, showing normal lungs (left & right) with the heart between them (Photo courtesy of Simon Fraser / SPL).

## Optimization of CTCA Protocols Offers Significant Radiation Dose Reduction

Optimization of protocols during computed tomography coronary angiography (CTCA) using prospective electrocardiogram (ECG) gating and breast shields can reduce the radiation dose delivered to the female breast by more than 80%.

CTCA is a common, noninvasive procedure that is used to evaluate the coronary arteries. Prospective ECG gating is an imaging technique that allows radiologists to scan only during a certain phase of the heart beat cycle. Breast shields are placed over the chest during a CT exam to block out primary X-ray beams, which are responsible for most of the breast radiation during a CT study.

"As cardiac CTCA has significant potential for the noninvasive imaging of coronary artery disease, its utilization is continuously increased, particularly among young women," said Sobhi Abadi, M.D., lead author of the study. "Therefore, the radiation dose delivered to the female's breasts should be addressed."

Researchers from the University Health Network (Toronto, Canada; [www.uhn.ca](http://www.uhn.ca)), scanned an adult female phantom using eight different CTCA protocols. "The highest breast dose (82.9 mGy) was associated with using retrospective ECG gating. The lowest breast dose (15.2 mGy) was achieved with prospective gating with narrow exposure window, resulting in an 82% reduction in breast dose. The use of surface breast shields resulted in an additional 38% reduction in breast dose," said Dr. Abadi.

The study was presented May 4, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting held in San Diego, CA, USA. "All use of ionizing radiation requires constant vigilance to ensure appropriate utilization and this is certainly true for CTCA," Dr. Abadi concluded. "Significant reductions in radiation dose will reduce the statistical likelihood of causing genetic damage and long-term risk of adverse results."

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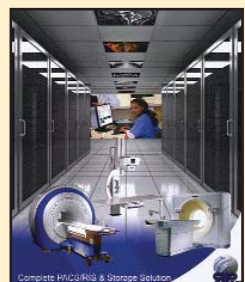
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## Simple Eye Imaging Measures Damage from Multiple Sclerosis

A fast, painless eye measurement shows promise as a way to diagnose multiple sclerosis (MS) in its very early stages and monitor the effectiveness of treatments, according to recent findings from a multicenter study.

"This technique has the potential to provide a powerful and reliable assessment strategy to measure structural changes in the central nervous system, both for diagnostic purposes and in clinical trials to monitor whether potential treatments can prevent deterioration or restore nerve function," said Dr. Elliot Frohman, professor of neurology and ophthalmology, director of the Multiple Sclerosis Clinical Center at the University of Texas (UT) Southwestern (Dallas, USA; [www.utsouthwestern.edu](http://www.utsouthwestern.edu)) and cosenior author of the study, which appears in the June 2010 issue of the journal *Annals of Neurology*.

The technique, called optical coherence tomography (OCT), effectively measures thinning of the retina in individuals with multiple sclerosis, the researchers found. "An ophthalmologist might someday be able to use OCT to identify retinal thinning during a routine eye exam and consider MS as a prime diagnosis," Dr. Frohman said. "However, this prospect is a long way off."

Retinal thinning can occur as a result of multiple sclerosis, but this study, according to Dr. Frohman, is the first to track such thinning over time in a single group of patients. The study involved 299 patients with MS who were tracked for six months to 4.5 years.

The researchers found that the retinas thinned significantly with time, and patients often concurrently lost visual sharpness. Overall, the study indicated that OCT is effective, easy to use, and

sensitive to changes over time. It could also be used with current clinical measures. Because the retina is easily visible through the pupil, it provides a convenient route for evaluating nerve damage, compared with other parts of the body. As a result, retinal measurement might be able to pick up signs of multiple sclerosis before a person develops other symptoms, according to Dr. Frohman.

OCT machines already are available. Patients look into a device similar to those that measure vision for corrective lenses. Near infrared light, which is invisible to the eye, penetrates the retina and provides information on its thickness. The measurement takes a few seconds for each eye.

Future studies are needed to ascertain whether OCT can characterize the effectiveness of treatments, according to Dr. Frohman.

## PET Imaging Leads to More Individualized Treatment for Non-Hodgkin's Lymphoma

According to recent findings, molecular imaging can evaluate and optimize non-Hodgkin's lymphoma therapy with Zevalin (ibritumomab tiuxetan), a front-line radioimmunotherapy pharmaceutical agent that uses a dose of radioactive material and mimics the body's own immune response to target and kill cancer cells while sparing neighboring healthy tissues.

"By using molecular imaging prior to treatment, physicians can improve the targeting of radioimmunotherapy and even allow for a larger and considerably more powerful radiation dose to the cancer without damaging surrounding healthy organs," said Nafees Rizvi, M.D., department of nuclear medicine and positron emission tomography (PET) research, VU University Medical Center (Amsterdam, The Netherlands; [www.vumc.com](http://www.vumc.com)). "This allows for an individualized approach to treatments, tailoring therapies to the individual patient."

Non-Hodgkin's lymphoma, a cancer of the lymphatic system, is considered the fifth-most common

cancer in the United States. There are many different forms of lymphoma, and treatment is determined based on disease progression and the kinds of cells affected.

Radioimmunotherapy is a relatively new and highly targeted combination of radiation and immunotherapy that uses molecular imaging to pinpoint the exact location of tumor cells. Once therapy has been mapped, physicians inject antibodies matched with a radioactive compound that targets the antigens of cancer cells, much like how the body's natural immune system works against common viruses and infections. The antibodies bind to the cancer cells, delivering a deadly dose of radiation to the tumor.

This study was conducted to evaluate the effectiveness of a molecular imaging agent called Zr-89-Zevalin, which is used in conjunction with PET, a molecular imaging technique that images biologic mechanisms in the body. Zr-89-Zevalin was assessed as the imaging agent for "scout scans" –

initial PET scans used for treatment planning before therapy – for six patients with relapsed B-cell non-Hodgkin's lymphoma scheduled for stem-cell transplant.

Study participants received PET scans after an injection of the imaging agent and again after receiving radioimmunotherapy. The imaging agent provided an accurate portrait of the biodistribution, or the likely path in the body, of a therapeutic dose of Y-90-Zevalin, without any negative impact from simultaneous injection. Results indicate that Zr-89-Zevalin and PET could be more effective than other imaging techniques and could lead to more effective and personalized therapy with Y-90-Zevalin.

Zevalin was developed by Spectrum Pharmaceuticals, Inc. (Irvine, CA, USA; [www.spectrumpharm.com](http://www.spectrumpharm.com)). The study's findings were presented at the Society of Nuclear Medicine's (SNM) 57th annual meeting, June 5, 2010, at Salt Lake City, UT, USA.



## MRI Reveals Brain Development Differences in Children with Fragile X Syndrome

Fragile X syndrome is the most common known cause of autism and inherited intellectual disability. Now, researchers using sophisticated, noninvasive imaging techniques have demonstrated how the brains of very young boys with fragile X syndrome differ from those of young boys without it, providing vital information for the development of treatments for the condition.

In a longitudinal study published online May 3, 2010, in the journal *Proceedings of the [U.S.] National Academy of Sciences (PNAS)*, researchers from the Stanford University School of Medicine (<http://med.stanford.edu>) and collaborators from the University of North Carolina-Chapel Hill (UNC; NC, USA; [www.unc.edu](http://www.unc.edu)) tracked anatomic changes that, over time, progressively differentiate the brains of children with fragile X syndrome from those of children without it.

Triggered by a mutation in a gene located on the X chromosome, fragile X syndrome affects about one in every 4,000 people, with more significant symptoms occurring in males than females. This disorder's genetics and neurobiology are relatively well understood, hastening the pace with which potential drug therapies have been moving through the pharmaceutical pipeline, said the study's senior author, Allan Reiss, M.D., a Stanford professor of psychiatry and behavioral sciences and professor of radiology.

Dr. Reiss, who directs the Center for Interdisciplinary Brain Sciences Research at Stanford, has been studying fragile X syndrome for more than 20 years. "A number of years ago, we saw new treatments quickly coming down the line," he said. "So we wanted to provide information that could be used to guide those treatments." Application of these new findings might enable scientists and clinicians to tell if a therapy is working in the very youngest of children diagnosed with this condition.

Fragile X syndrome alone accounts for approximately 2% - 3% of all cases of autism, making it the most common known, specific genetic risk factor for that disorder, although not all people with fragile X syndrome develop autism. Autism is increasingly viewed as not a single disease but a spectrum of them. A

large number of diverse genes have been identified as contributing to autism, but with each responsible for only a sliver of cases. Fragile X syndrome patients often manifest discomfort with eye contact, hypersensitivity to sound or touch, abnormalities of language and movement, and varying levels of developmental delay.

In the study, the Stanford and UNC investigators used high-resolution magnetic resonance imaging (MRI) to obtain detailed images of one- to three-year-old boys' brains, and followed-up two years later with a second imaging session. The MRI findings were analyzed at Stanford, chiefly by Dr. Reiss and the study's lead authors: Fumiko Hoeft, M.D., Ph.D., an imaging expert, and instructor at the Center for Interdisciplinary Brain Sciences Research (CIBSR), and medical student John Carter. MR brain images from 41 fragile X syndrome boys were compared with those from age- and developmentally-matched control subjects: 21 boys who were developing typically, and 7 others who were experiencing nonfragile-X-related developmental delay.

Whereas many features of brain anatomy were similar from one group to the next, the fragile X brains evidenced at an early age (that is, during their first imaging session at one to three years of age) an overabundance of gray matter in such regions as the caudate and thalamus, and a diminished presence in a part of the cerebellum called the vermis. This suggests that the fragile X syndrome mutation had already begun to cause identifiable, consistent changes in brain development, perhaps even before birth. However, the basal forebrain as well as a different part of the thalamus and many areas of the cerebral cortex of fragile X patients, while interchangeable from those of control subjects during the first imaging session, diverged from their counterparts two years later. These findings suggest that specific downstream effects of the mutation become evident only later in brain development.

Knowing the locations of fragile X syndrome brain-structure abnormalities and the developmental time course over which they occur – and

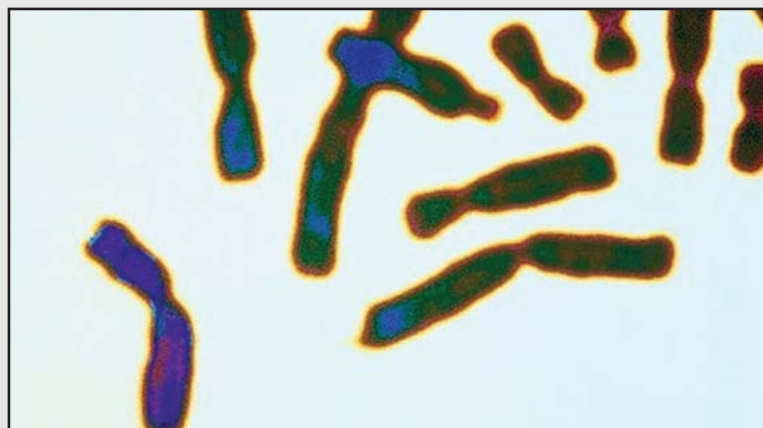



Image: Light micrograph of an X chromosome (purple) with fragile X syndrome, a genetic cause of mental retardation (Photo courtesy of CMSP).

being able to noninvasively detect those changes in young patients – will make it possible to monitor new ther-

apies' effectiveness in (it is hoped) restoring patients' brain structure and function to normality.




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## Whole-Body MRI Shown Very Accurate in Early Detection of Breast Cancer Metastases

Whole-body magnetic resonance imaging (MRI) should be the imaging modality of choice for the detection of breast cancer metastases because it is highly accurate and can identify bone metastases while a patient is still asymptomatic, according to new findings.

Whole-body MRI is a noninvasive medical technique that helps physicians diagnose and treat breast cancer. Breast cancer cells typically spread to the bones, lungs, liver, or brain. Metastatic breast cancer tumors may be found before or at the same time as the primary tumor, or months and even years later. "It is important that we detect metastases early in order to ensure the patient is getting the appropriate treatment. This study shows that whole-body MRI can accomplish this task and is ready to be used for this indication," said Joshita Singh, M.D, lead author of the study.

In addition to MRI scanning, other imaging modalities commonly used to detect breast cancer metastases include positron emission tomography – computed tomography (PET/CT), chest X-rays, bone scans, and ultrasound of the abdomen and pelvis.

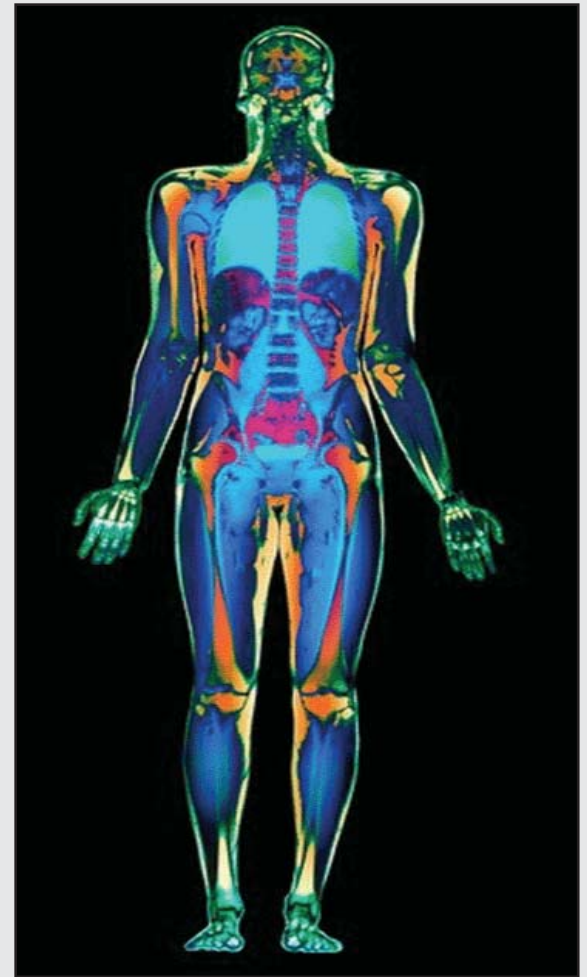
The study, performed at Deenanath

Mangeshkar Hospital and Research Center (Pune, India; [www.dmhospital.org](http://www.dmhospital.org)), included 99 patients with known breast cancer who were evaluated for metastases using whole-body MRI.

"Of the 99 patients, MRI accurately revealed that 47 patients were positive for metastases while 52 were negative. Of those patients who were positive for metastases, whole-body MRI frequently detected bone metastases earlier when the patient was still asymptomatic," said Dr. Singh. "As our study suggests whole-body MRI is an effective tool for the detection of metastases and unlike other procedures commonly used in this role, it emits no radiation. We highly recommend that whole-body MRI be the imaging modality of choice for the detection of metastases in patients with breast cancer," she said.

The study findings were presented May 6, 2010, at the American Roentgen Ray Society (ARRS) 2010 annual meeting in San Diego, CA, USA.

*Image: Colored magnetic resonance imaging (MRI) scan of the whole body of a man in coronal (frontal) section (Photo courtesy of Simon Fraser / SPL).*



## Molecular Imaging Probes Pinpoint Prostate Cancer

Molecular imaging has a significant new weapon in the fight against prostate cancer. New research demonstrates how an innovative peptide-targeted imaging agent could help clinicians detect a biologic process that signals cancer in prostate cells. Data gathered about this process may even differentiate prostate tumor types and the progression of disease.

"This new molecular imaging tool will help us develop new diagnostic and therapeutic options for prostate cancer patients," said Chiun-Wei Huang, Ph.D. candidate, lead author, and researcher at the Molecular Imaging Center of the Keck School of Medicine, University of Southern California (Los Angeles, CA, USA; [www.usc.edu/keck](http://www.usc.edu/keck)). "By identifying a signature on the cell-surface of specific tumor types at different stages, we could potentially develop better and more customized treatments for truly personalized medicine."

In this study, researchers used near-infrared fluorescent imaging, an optical imaging technique that images the low frequency light emitted from an imaging agent containing fluorescent dye. The novel agent

used in the study was prepared with a peptide that targets receptor activity involved in the prolific growth of certain tumor cells. This specific sequence of receptor activity is called  $\alpha 2\beta 1$  integrin, an expression of building-block proteins such as collagen. Cells that display an abnormal overabundance of this activity could be cancerous, and imaging that focuses on this biologic mechanism could provide vital information about the aggressive growth, survival, migration, and invasiveness of individual cases of prostate cancer.

The study's findings revealed that high absorption of the peptide-targeted agent positively identified prostate tumors both in the laboratory and in three prostate tumor-bearing models. Further development of this and similar imaging agents could lead to more effective and detailed diagnosis of prostate cancer and it could be used to test the effectiveness of new drug therapies to treat the disease.

The study's findings were presented at the Society of Nuclear Medicine's (SNM) 57th annual meeting, June 5-9, 2010, in Salt Lake City, UT, USA.

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## Nanoparticles May Help Surgeons by Tagging Brain Tumors

Researchers have developed a way to enhance how brain tumors appear on magnetic resonance imaging (MRI) scans and during surgery, making the tumors easier for surgeons to identify and remove. Scientists from Ohio State University (Columbus, USA; [www.osu.edu](http://www.osu.edu)) are experimenting with different nanoparticles that they hope may one day be injected into the blood of patients and help surgeons remove lethal brain tumors known as glioblastomas.

In the April 9, 2010, issue of the journal *Nanotechnology*, researchers reported that they have manufactured a small particle called a nanocomposite that is both magnetic and fluorescent. These nanocomposites measure less than 20 nm in size. "Our strategy is combining two particles that contain different properties to make one particle with multiple properties," explained Dr. Jessica Winter, assistant professor in chemical and biomolecular engineering and biomedical engineering at Ohio State.

The magnetic nanoparticles highlight color contrasts within MRI scans, allowing clinicians to see potential or existing cancerous tumors before

surgery. The fluorescent nanoparticles can change the color that the tumor appears in the brain when seen under a special light.

Neurologic surgeons could benefit from a multifunctional particle that would allow them to better see the tumor with an MRI before surgery, and then see it physically during surgery, according to Dr. Winter. "We're trying to develop a single nanocomposite that's magnetic – so you can do preoperative MRI – and that's fluorescent – so that when neurological surgeons go into surgery, they can shine a light on the tumor and it will glow a specific color such as green, for example. Then, the surgeon can simply remove all of the green," Dr. Winter stated.

Dr. Winter's study provided convincing proof that a particle with dual properties can be formed. However, these multifunctional particles cannot be used for animal or human testing because the fluorescent particle, cadmium telluride, is toxic. "We're currently working on an alternative fluorescent particle which is composed of carbon. This will eliminate the complications that arise with ingesting the cadmium telluride particles,"

Dr. Winter said.

One of the successes in creating the new nanocomposite particle was how they did it, Dr. Winter noted. It is typically difficult to combine particles such as these, a process known as doping. The Ohio State researchers pursued an approach, which had not been tried before. They chose to bind their fluorescent particle on top of their magnetic particle at extremely high temperatures.

"The key is that our synthesis is done at pretty high temperatures – about 350 °C Dr. Winter explained. "The synthesis was unexpected, but cool at the same time, and we were excited when we saw what we got."

The lead neurologic surgeon that collaborates with Dr. Winter and her team, an assistant professor with the department of neurological surgery, Dr. Atom Sarkar, hopes to assess the application on animals at some point. First, they have to produce a particle that contains no toxic ingredients. If results continue to be encouraging, Dr. Winter is optimistic that similar multifunctional particles could become an innovative part of neurologic surgery within the next five years.

## New Molecular Imaging Agent May Help Visualize Early Stages of Alzheimer's Disease

A multinational clinical trial revealed that a novel imaging agent could be the next major breakthrough for the early detection of Alzheimer's disease (AD).

The new agent is used in conjunction with a molecular imaging technique called positron emission tomography (PET) and works by binding to beta-amyloid, a naturally occurring protein that accumulates in the brain and is thought to be a precursor to Alzheimer's. Scientists aim to refine beta-amyloid imaging and use it with new drug treatments that could potentially slow or even halt the disease before irreparable damage and dementia set in.

"Early detection and treatment of Alzheimer's disease is essential and current methods of diagnosis, such as cognitive tests, are helping to catch the disease at its advanced stages, when the patient is already suffering from distinct cognitive impairments," said Osama Sabri, M.D., Ph.D., professor, director and chairman of nuclear medicine at Leipzig University (Leipzig, Germany; [www.uni-leipzig.de](http://www.uni-leipzig.de)). "The imaging of beta-amyloid may assist clinicians in differentiating Alzheimer's disease from other types of dementia. Moreover, this research will help to maximize the quality of life for patients who are still in the early stages of Alzheimer's and who still have the ability to play an active role in planning for the future."

AD kills by damaging and ultimately destroying neurons through-

out the brain, incapacitating vital centers of the brain that control memory and thinking, as well as motor skills and essential commands to the body's other vital organs. In the past, making a tangible diagnosis of AD has proven difficult and it was only successful at postmortem.

Complicating matters is the fact that there are different forms of dementia and diagnosis can take years. The new imaging agent, called Florbetaben, provides direct visualization of beta-amyloid during the pathogenesis, or development, of disease. Monitoring the aggregation and spread of beta-amyloid through molecular imaging may help clinicians to determine the progression of the disease and collect data about its impact at the cellular and molecular levels. Florbetaben was developed by Bayer Schering, AG (Berlin, Germany; [www.bayerscheringpharma.de](http://www.bayerscheringpharma.de)).

In the study, 81 patients believed to have AD and 69 healthy subjects, ages 55 and older, were imaged with Florbetaben and PET in 18 different centers across three continents to evaluate the agent's potential for diagnosing Alzheimer's disease both visually and quantitatively by normalizing to an amyloid-free reference region in the brain and analyzing the segmented data. Both methods proved to be highly accurate in diagnosing the disease.

There are other agents in use and currently in development for imaging beta-amyloid using different molecu-

lar compounds to target the protein. However, Florbetaben and other fluorine-based compounds may be effective for routine use due to the prevalence and widespread use of the com-

pound in molecular imaging.

The study's findings were presented at the Society of Nuclear Medicine's (SNM) 57th annual meeting June 5-9, 2010, in Salt Lake City, UT, USA.

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## IMAGE/DATA MANAGEMENT Agfa HealthCare

The IMPAX 6 RIS/PACS is a central component of the IMPAX Enterprise solution. The Enterprise is designed to expand image and information management options beyond radiology, and includes IMPAX RIS, IMPAX Reporting, IMPAX Mobile, IMPAX SMMS, and Audit Services.

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## GRAYSCALE DISPLAY Barco

The Nio 5MP diagnostic display system features a resolution of 2096 x 2800, high brightness, and image clarity. Additional benefits include high-speed display controllers, color matching between displays, and a protective front cover.

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## POSITIONING DEVICE Brainlab

The ExacTrac Infrared Monitoring is an add-on device that helps users of cone-beam CT monitor patient positioning during radiation therapy treatments. The ceiling-mounted device works with most linear accelerators, monitors patient positioning, and checks for reference positions.

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## BREAST IMAGING WORKSTATION Carestream Health

The multimodality workstation allows radiologists to read exams from all modalities and vendors at a single workstation. Prior exams are delivered with the current exam, and protocols are personalized to ensure maximum productivity.

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## Optimized CT and MR Segmenting Software Used to Accelerate Study of Segmenting Process

New computed tomography (CT) and magnetic resonance imaging (MRI) segmenting software is being used in a study to improve workflow and enhance technologist productivity by reducing the time required to accurately split multiregion CT and MR scans (i.e., chest-abdomen-pelvis) into anatomic regions that match the original orders from the radiology information system (RIS) and reducing the time required for the newly split studies to be sent to the picture archiving communications system (PACS). Mach 7 Technologies (M7T; Burlington, VT, USA; [www.mach7t.com](http://www.mach7t.com)), a global provider of flexible, PACS-neutral healthcare image management solutions, has developed a state-of-the-art modality workstation application, the Keystone Study Split Utility (SSU), for a Massachusetts General Hospital Imaging (MGH; Boston, MA, USA; [www.mgh.harvard.edu](http://www.mgh.harvard.edu)) study.

With the new Keystone SSU application, radiologists who specialize in one region of the body will

rapidly get just the images they need to interpret while ensuring accurate billing for all orders entered into the system. The efficient and accurate splitting of studies is important as a means of speeding time to diagnosis, enhancing patient care, and improving operational and business processes.

"The Keystone Study Split Utility improves technologist workflow when splitting multiregion scans from CT or MR," noted Mary-Theresa Shore, director of clinical operations at MGH. "Based on initial testing data from the Keystone SSU clinical pilot, we are excited about the anticipated increased technologists' efficiency that the utility will deliver from scanner to PACS."

Designed for simplicity and continuity, the SSU receives multiregion studies and provides a straightforward work list interface from which studies can be selected for splitting by technologists. Once selected, the study loads quickly into the splitting interface at the Image level or Series level. From this intuitive

user interface, technologists can easily highlight images or series and relate them to the original accession numbers (orders) derived from the Digital Imaging and Communications in Medicine (DICOM) modality worklist coming from the RIS or PACS broker. If they have not completed the exam in the RIS, the SSU automatically generates a reminder before allowing the technologist to split the study.

The SSU enables overlapping between anatomic regions and the ability to send the scout image and dosage report image or series with all of the resulting studies. Once the split definition step is completed, the technologist initiates the split/send function with a minimum of clicks. The SSU then automatically splits the original study into the defined studies for each anatomical region and associates them to the proper accession numbers. The SSU sends a Storage Commit Query to the PACS to autoverify that the studies are in the PACS before purging them from memory.

## Visualization and Analysis Software Provides New Clinical Functionality and Workflow Capabilities

New visualization and software applications include cardiac multichamber analysis with adult and pediatric options that automate atrial and ventricular chamber analysis and leverage low-dose computed tomography (CT) scanning protocols. Clinical enhancements to cardiac structural analysis tools, vessel probe and vessel walk, allow easy navigation through complex cardiovascular anatomy.

Vital Images, Inc. (Minneapolis, MN, USA; [www.vitalimages.com](http://www.vitalimages.com)), a provider of advanced visualization and analysis software, announced the immediate availability of Vitrea Enterprise Suite 1.3 with new clinical capabilities including adult and pediatric cardiac applications, and an enriched set of workflow tools. Less than six months after releasing the company's 1.2 version, Vital Images builds upon Vitrea Enterprise Suite's effectiveness and ease of use via the web in a true thin client solution.

A range of additional workflow features makes it easier to review CT and MR scans while a new

edge-detecting contouring tool, single-click volume segmentation and improved report access streamline case reviews and enhance communication between clinicians.

Vitrea Enterprise Suite 1.3 also now enables web-based access to MeVis Visia CT Lung, the first clinically validated computer-aided detection (CAD) system for chest CT. MeVis' patented CAD technology platform seamlessly integrates within Vital Images' optimized reading workflow. In addition, Medicsight ColonCAD integration and a new myocardial perfusion application are available outside the United States.

"Vitrea Enterprise Suite is designed to make complex, imaging-based clinical information simple so clinicians can make fast, effective decisions that improve patient lives. We are committed to continually providing software improvements that increase efficiency and improve patient diagnosis and outcomes," said Erkan Akyuz, executive vice president product strategy and development, Vital

Images. "The new cardiac capabilities and the introduction of pediatric functionality take advantage of Vitrea Enterprise Suite's robust, scalable, thin client architecture which serves as the foundation for these exciting features and enables innovative product development."

The Vitrea Enterprise Suite (VES) is a package of advanced visualization tools, clinical applications, and data management systems that produce 3D and 4D images to show anatomic structures and physiologic function using computed tomography (CT) and magnetic resonance (MR) image data, supplying information to promote more informed clinical decisions during analysis and treatment planning processes. Vitrea fX is designed specifically for the Toshiba Medical Systems' (Tokyo, Japan) AquilionONE CT scanner. The Vitrea line includes advanced visualization solutions and clinical applications for seamless integration into picture archiving and communications system (PACS) as well as tools that can be accessed anywhere, anytime.



## Breast Imaging Center Streamlines Workflow with PACS, Multimodality Workstations

With new picture archiving and communications system (PACS) and multimodality workstations, radiologist productivity has been considerably improved, and a U.S. breast center is now able to offer same day reporting for all diagnostic and screening exams.

In the past, reports on screening exams from remote clinics often took several days. High patient volumes require high-end technology. With five locations that see 400 patients a day, Park Nicollet Jane Brattain Breast Center (St. Louis Park, MN, USA; [www.parknicollet.com/BreastCenter/locations.cfm](http://www.parknicollet.com/BreastCenter/locations.cfm)) converted to an efficient, all-digital workflow after implementing a Carestream PACS and six multimodality breast imaging workstations from Carestream Health (Rochester, NY, USA; [www.carestreamhealth.com](http://www.carestreamhealth.com)).

The main diagnostic center performs 240 exams a day with five full-field digital mammography (FFDM) systems, three ultrasound, two stereotactic

biopsy systems, and a breast-specific gamma imaging system. All exams conducted at the main center – along with screening exams from remote clinics and breast magnetic resonance imaging (MRI) exams conducted at Park Nicollet Methodist Hospital – are read by radiologists at the center. “Creating a smooth mammography workflow is complicated because of the diverse modalities now used for breast imaging. The Carestream PACS offers an exceptional workflow through its smooth integration with existing RIS [radiology information system], VR [voice recognition], and CAD [computer-aided detection] systems and its superior toolset for mammography reading,” said Kathy Wilson, supervisor of the Breast Center. The PACS is integrated with the center’s RIS, PowerScribe, and CADstream for MRI systems.

Radiologists praise the mammography tools delivered by the PACS and the multimodality workstations, according to Ms. Wilson. “These workstations allow our radiologists to read exams from all modal-


ities and vendors at a single workstation, which is a huge advantage. Prior exams are delivered with the current exam and hanging protocols are personalized for each radiologist to ensure maximum productivity. In addition the workstation’s innovative hand-held controller reduces hand movements and delivers better ergonomics.” Prior exams are now digitized to eliminate couriering film exams from remote clinics. Paper has been completely eliminated from the reading process. Carestream Health’s PACS and multimodality breast imaging workstations deliver specialized mammography reading tools – including chest wall justification, tissue invert, quad zoom, and others – for use with images from FFDM, computed radiography (CR) mammography, breast MR, breast ultrasound, digitized films, and general radiography modalities. Carestream PACS integrates smoothly with existing management information systems (MIS), RIS, and speech recognition systems as well as digital CAD systems.

## Data-Driven Prediction Tools Designed for PET/CT


Unplanned downtime from clinical equipment can negatively affect virtually every aspect of care delivery – from patient to staff productivity and cost control. A new application utilizes data-driven prediction tools to monitor specific system components. Originally deployed on GE’s computed tomography (CT) and interventional cardiovascular imaging systems, the technology is now being used in nuclear medicine and positron emission tomography (PET)/CT to proactively monitor system performance, alert GE field engineers to variations in specific component performance, and forecast maintenance needs to enable the least amount of disruption to operations.

GE Healthcare (Chalfont St. Giles, UK; [www.gehealthcare.com](http://www.gehealthcare.com)), a unit of General Electric (Fairfield, CT, USA), introduced InSite OnWatch, a feature of GE’s AssurePoint Services product range, at the Society of Nuclear Medicine (SNM) 2010 annual meeting in Salt Lake City, UT, USA, June 5-9, 2010. InSite OnWatch, available only with GE’s AssurePoint Rapid and AssurePoint Performance service offerings (USA and Canada only), remotely resolves small performance issues and forecasts maintenance on certain larger issues to reduce unplanned downtime – improving efficiencies and helping to lower the cost of care. InSite OnWatch is now available on GE’s Discovery NM 530c, the Discovery NM/CT 570c and the Discovery PET/CT 600 series systems with the new Discovery Dimension console.

AssurePoint Services are backed by a network of more than 3,500 local field engineers as well as dedicated remote online engineers with deep industry and technology expertise to deliver fast, professional response when it is needed. “The addition of InSite OnWatch to GE’s leading AssurePoint Service platform helps minimize the risk of having to reschedule patients and allows customers to schedule required maintenance around their schedule, minimizing unplanned downtime,” said Mike Swinford, vice president and general manager, Americas Service. “Introducing InSite OnWatch to the nuclear medicine and PET/CT communities will only enhance our proven performance – providing exceptional service to improve system workflow and overall patient care.”

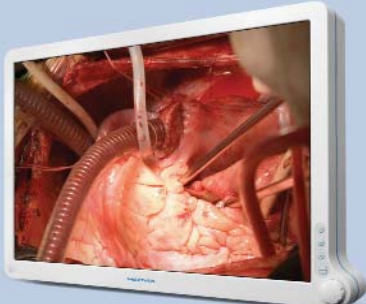



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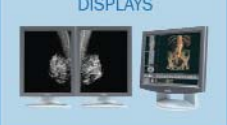













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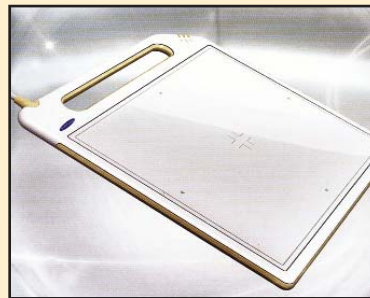
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### IMAGE MANAGEMENT SOFTWARE Siemens Healthcare

The syngo fourSight Workplace provides true stereoscopic views of 3D images, allowing for a more detailed and real-to-life imaging experience. The cost-effective software is considered ideal for both physicians and their patients.

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### IMAGE PROCESSING UNIT Vatech

The Xmaru 1417P is developed with a flat panel X-ray detector by Samsung, and is intended to provide enhanced image resolution. Key features include a specially designed grip, small power box, user-friendly design, and versatile application.

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### MEDICAL PROJECTOR Canon

The REALiS SX7 Mark II D is designed for viewing monochrome digital X-rays, CT scans, and MR images with accurate color and precise detail. The DICOM simulation mode serves to simulate the results of DICOM-compliant devices for display of grayscale images.

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## Breast Imaging PACS Provides Secure Access to Multimodality Images

With its enterprise-wide licensing model, a breast imaging picture archiving and communication system (PACS) eliminates the need for hospitals to manage expensive dedicated workstations and provides a secure access to multimodality images, including priors, from any location within the facilities or remotely. Moreover, hospitals and radiologists enjoy significant productivity gains by using the system's universal reading and reporting interface for all studies, including breast imaging.

Intelrad Medical Systems (Denver, CO, USA; [www.intelrad.com](http://www.intelrad.com)), a developer of medical imaging PACS and workflow solutions, announced that Naples Diagnostic Imaging Centers (Naples, FL, USA; [www.naplesxray.com](http://www.naplesxray.com)) will be replacing its current mammography workstations with the IntelPACS Breast Imaging digi-

tal mammography solution. Naples Diagnostic Imaging Center is part of the NCH Healthcare System; an alliance of more than 500 independent physicians and medical facilities. It includes a two-hospital, 681-bed system, providing personalized care to over thirty-thousand patients every year.

"Radiology and imaging is central to all that takes place at [our centers], we know how important managing the PACS workflow is to the overall operation," said Jim Bates, director of radiology of NCH Healthcare System. "We immediately saw the benefits of working from a single PACS worklist, being able to access images and priors from different types of modalities for both screening and diagnostic workflows. The other significant advantage of IntelPACS is that you can manage workload balancing between your radiologists, ensuring faster turnaround on diagnoses of patients and delivering

a better service to our referring physicians."

NCH deployed Intelrad IntelPACS in 2008 and they immediately experienced increased productivity and cost savings. "With the addition of IntelPACS Breast Imaging, NCH will now be completely paperless for all its medical imaging radiology services," said Chris Henri, founder and chief technology officer of Intelrad Medical Systems. "We truly appreciate working with NCH, and we are confident that IntelPACS will allow NCH to deliver superior care to the communities it serves through its Women's Health program in Florida."

IntelPACS relies on a scalable, flexible, and fault-tolerant architecture. Intelrad solutions increase productivity, encourage physician loyalty, foster collaboration, and support best quality management practices.

## Software Security Patent Helps Improve Health IT Privacy

A computer security invention patented a decade ago by the U.S. National Institute of Standards and Technology (NIST; Gaithersburg, MD, USA; [www.nist.gov](http://www.nist.gov)) is now poised to help safeguard patient privacy in hospitals.

The security patent involves a sequence managed by a workflow management system, which enacts each segment in the order specified by that process definition. Role-based access control (RBAC) is used to define membership of individuals in groups, and then to activate the roles with respect to the process at appropriate points in the sequence; any individual member belonging to the active role can perform the next step in the process. Changes in the duties and responsibilities of individuals as they change job assignments are greatly simplified, as their role memberships are simply reassigned; the workflow process is unaffected.

For example, at a hospital, the patient admission procedure involves a number of steps, and at each step, someone needs access to the patient's medical

records for a specific purpose, such as registering the patient or verifying their insurance information. Once admitted to the hospital, the admissions staff does not necessarily need further access to health records. However, in many hospitals, those staff members nonetheless continue to have access to every record on file; by using the algorithm, those staff members would only be able to access the patient record during admission processing. After that, patient information would be unavailable to them, although the attending physician would still have access to it.

"We think this software will provide dramatically improved security and privacy to patients," said John Barkley, the algorithm's creator, who has retired from NIST's software and systems division and is now consulting for Virtual Global (Boston, MA, USA; [www.virtualglobal.com](http://www.virtualglobal.com)), the company, which is commercializing the product. "It solves the problem of overly broad access to patient information, which is widespread."

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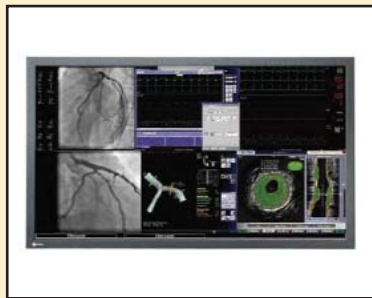
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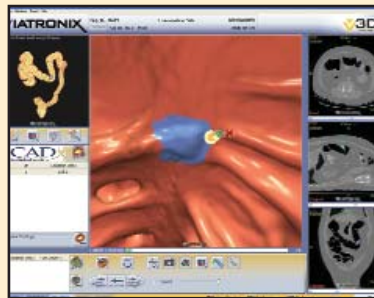




### COLOR LCD MONITOR Eizo Display Technologies

The RadiForce LS560W features high flexibility in arranging different screen layouts, as well as fully automated stability through the ISS. Other benefits include DICOM/CIE compliance, user-defined tables, and built-in connector for spotmeter.

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### IMAGING DETECTION TOOL iCAD

The VeraLook computer-aided detection product is designed for use in the interpretation of virtual colonoscopy exams. The tool helps to identify polyps in images that can be highlighted for further review by the interpreting physician.

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### GRAYSCALE DISPLAY BUNDLE NEC Display Solutions

The MultiSync MDG3MP-BNDL features two MultiSync MD213MG 3MP displays and a graphics card. Key benefits include out-of-the-box calibration, built-in front sensor, digital uniformity correction, and software for consistent image quality.

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### CLINICAL REVIEW MONITOR Point A Technologies

The MediVision MVW-2402 features a slim, front mask design, and a tilt, swivel and pivot desktop stand. Other benefits include touch screen calibration mode selection, DICOM compliance, remote control, as well as PBP and PIP.

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## RIS/PACS Features Simplified Installation, Performance, and Broad Range Display

A radiology information system/picture archiving and communications system (RIS/PACS) is designed to handle the demands of high volume departments, large stand-alone hospitals, and entire hospital networks, up to the regional and even national level.

Matrox Graphics, Inc. (Montreal, Canada; [www.matrox.com](http://www.matrox.com)), a manufacturer of specialized graphics solutions, reported that GE Healthcare's (Chalfont St. Giles, UK; [www.gehealthcare.com](http://www.gehealthcare.com)) information technology (IT) division, in Dornstadt, Germany, is recommending Matrox Xenia Series display controller boards for GE Centricity RIS/PACS workstations.

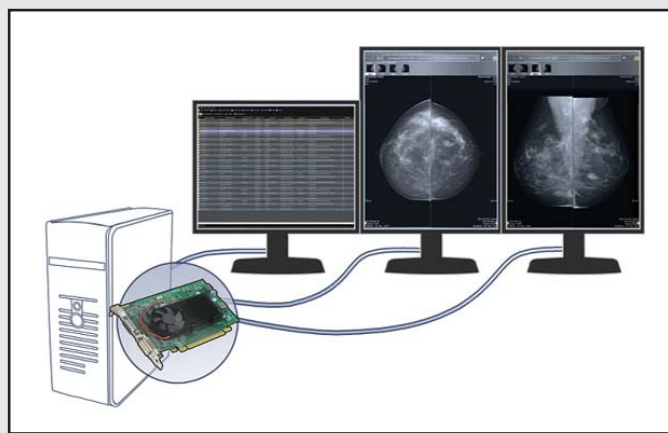
Widely recognized as an industry leader in image and information management, GE Centricity RIS/PACS is developed with a strong commitment to improving patient care across the healthcare enterprise by enabling better, timelier decisions, combined with GE Centricity standards-based architecture, is helping healthcare providers leverage existing IT investments.

"Our evaluation of Matrox Xenia Series identified a number of strengths for Centricity PACS customers," said Juergen Reyinger, vice president and general manager at GE Healthcare IT for Europe,

the Middle East, and Africa (EMEA). "Installing one card instead of two for the classical three-monitor PACS workstation setup accelerates deployment and also reduces potential IT support issues across multiple stations, in an environment where downtime is not an option."

Matrox Xenia Series' triple digital display support including forward- and backward-compatibility with a wide range of display brands, resolutions, and formats, fits well with GE's standards-based approach for radiology workstations. Excellent image quality at resolutions ranging from under 1 megapixel up to 8 megapixels and new technology to enable optimum display calibration (via Matrox DLC and 8/10/13-bit gamma LUTs [lookup tables]) are also key benefits. 1 gigabyte of on-board memory for smooth, effective performance boosts overall productivity, facilitating efficient diagnosis and reporting by medical imaging professionals on any known display.

"Matrox is pleased that Centricity RIS/PACS



clients in Germany now have an approved Xenia Series display controller board to power their workstations," said George Rigas, business development manager for Medical Imaging, Matrox Graphics, Inc. "With flexible display support and image quality that medical imaging professionals have always relied upon, users of Xenia Series will not be disappointed with this combination."

*Image: The Xenia series of display controller boards (Photo courtesy of Matrox Graphics).*

## Web Access Systems Offer Integration of Medical Imaging Standards

New Web access solutions provide the latest standards for building image-enabled electronic health records (EHRs) and general health information technology (IT) applications.

Continuing its commitment to interoperability solutions through open standards, Merge Healthcare (Milwaukee, WI, USA; [www.merge.com](http://www.merge.com)), a leading health IT solutions provider, announced new releases of its core interoperability solutions. These applications bring advanced capabilities to vendors interested in developing and integrating the latest medical imaging standards into their health IT products.

Merge Healthcare's WebAccess is a standards-

based software portal technology capable of consolidating diagnostic information from multiple disparate sources and delivering it to users through a zero-client web browser. Already in use by providers to "image-enable" EHR and health information exchange (HIE) solutions, this latest version provides additional standards-based middleware components to help expand health information exchange outside the traditional clinical or provider "silos." WebAccess 2.3 now offers Enterprise Master Patient Index (EMPI) capability, which manages the multiple patient identities that typically exist across a healthcare enterprise.

In addition to WebAccess, Merge recently released its latest MergeCOM-3 Toolkit offering. The latest Digital Imaging and Communications in Medicine (DICOM) release includes structured report templates that facilitate workflow efficiency and mining of critical information, such as radiation dose exposure, that is typically locked away in free text reports.

"Interoperability among IT applications continues to be a requirement if we are to realize the promise of improved patient care and cost savings through the meaningful use of software in healthcare," said Justin Dearborn, Merge Healthcare's CEO.



## Philips Healthcare Acquisition to Expand PACS Offerings

Philips Healthcare (Best, the Netherlands; [www.medical.philips.com](http://www.medical.philips.com)) announced that it has agreed to acquire the business of CDP Medical, Ltd. (Petah Tikva, Israel; [www.cdpmmedical.com](http://www.cdpmmedical.com)), a provider of picture archiving and communication systems (PACS), and a subsidiary of medical device distributor Medtechnica, Ltd. (Petah Tikva, Israel).

This acquisition marks the next step in the execution of Philips Healthcare's strategy to expand its clinical informatics product range with solutions that increase its ability to meet the diverse and growing needs of the different markets worldwide. "This is an important step on our journey to complete our range of clinical informatics and

patient care solutions that simplify clinician workflow, improve financial outcomes for our customers, and help improve and save lives," said Steve Rusckowski, CEO for Philips Healthcare.

PACS enable medical images to be stored electronically and viewed on physician and clinician workstations in and outside hospitals, creating more efficient workflow and improved clinical results. PACS serves an increasingly crucial role in current healthcare environment as the need to streamline workflow and manage costs, all while providing high-quality care, is universally top of mind for governments, insurers, hospital administrators, and medical teams.

## Hologic Acquires Breast MRI Developer

Hologic, Inc. (Bedford, MA, USA; [www.hologic.com](http://www.hologic.com)), a developer, manufacturer, and supplier of diagnostics, medical imaging systems, and surgical products focused on serving the healthcare needs of women, announced the completion of its acquisition of Sentinelle Medical, Inc. (Toronto, Canada; [www.sentinellemedical.com](http://www.sentinellemedical.com)), a provider of magnetic resonance imaging (MRI) breast coils, tables, and visualization software.

Sentinelle Medical, a privately

held medical imaging company, is focused on developing advanced breast imaging technologies using high-field strength MRI that will help in the earlier detection and better treatment of breast cancer.

The total value of the transaction was US\$85 million, plus a two-year contingent earn out. The earn out will be payable in cash installments equal to a multiple of the incremental revenue growth in Sentinelle Medical's business in the two years following the August 2010 closing date.

## GE and Intel to Join Forces in Telehealth Venture

General Electric (Fairfield, CT, USA; [www.gehealthcare.com](http://www.gehealthcare.com)) and Intel Corp. (Santa Clara, CA, USA; [www.intel.com](http://www.intel.com)) have announced a definitive agreement to form a 50/50 joint venture to create a new healthcare company focused on telehealth and independent living. The new company will be formed by combining assets of GE Healthcare's (Chalfont St. Giles, UK) Home Health division and Intel's Digital Health Group, and will be owned equally by GE and Intel.

Pending regulatory and other customary closing conditions, the joint venture is expected to become operational by the end of the year. Financial terms were not disclosed. The venture builds on the GE-Intel healthcare alliance announced in April 2009 around independent living and chronic disease management. GE and Intel are using technology to bring more effective healthcare into millions of

homes and to improve the lives of seniors and people with chronic conditions. With the dramatic increase of people living with chronic conditions, and a global aging population, both companies realize that there is a need to find new models of healthcare delivery and extend care to the home and other residential settings.

Once formed, the new company will develop and market products, services, and technologies that promote healthy, independent living at home and in assisted living communities worldwide. It will focus on three major segments: chronic disease management, independent living, and assistive technologies. GE Healthcare and Intel will contribute assets in remote patient monitoring, independent living concepts, and assistive technologies, such as the Intel Health Guide, Intel Reader, and GE Healthcare's QuietCare.

## Carestream Health Acquires X-Ray Manufacturer

Carestream Health (Rochester, NY, USA; [www.carestreamhealth.com](http://www.carestreamhealth.com)) has acquired Quantum Medical Imaging, LLC (Ronkonkoma, NY, USA; [www.quantummedical.net](http://www.quantummedical.net)), a privately held manufacturer of digital and conventional X-ray systems used by hospitals, imaging centers, and health clinics. With this acquisition, Carestream Health becomes a global leader in X-ray imaging—providing a wide range of traditional and digital X-ray systems for healthcare providers worldwide. Quantum Medical Imaging's product range enhances and complements Carestream Health's product line, and the combination of the two companies will enable Carestream to serve better the specialized imaging needs of community hospitals and clinics globally.

Similarly, Quantum Medical Imaging's dealers and customers will have access to Carestream Health's innovative medical imaging and healthcare information technology (IT) solutions. The joint expansion of these product lines and the extended market reach, according to Carestream Health spokespersons, will lead to more options for customers, and continued

growth for both organizations.

Quantum Medical Imaging markets both digital radiography (DR) and conventional X-ray systems; computed radiography (CR) systems; and X-ray system components. The company serves hospitals, imaging centers, orthopedic facilities, and medical clinics by providing innovative and cost-effective medical imaging solutions appropriate for their unique needs.

Quantum Medical Imaging's dealers and the customers they serve should see significant benefits from this acquisition as they will have access to a considerably larger range of sophisticated Carestream products including CR systems; the DRX-1 family of wireless digital upgrades; entry level radiology information system/picture archiving and communication system (RIS/PACS) and archive solutions; and medical film printers.

Quantum Medical Imaging's headquarters, employees, and management team will remain in Long Island, NY, USA. The company has just extended the lease on its headquarters and manufacturing facility through 2018.

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## NOVEMBER 2010

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**National Conference on OB-GYN Ultrasound.** November 5-7; Chicago, IL, USA; Web: http://iame.com/conferences

**10th Annual Emergency Radiology Symposium.** November 7-10; Miami, FL, USA; Web: http://cmetracker.net

**5th Annual Meeting of the Section for Magnetic Resonance Technologists (SMRT) - Australia New Zealand Local Chapter.** November 13-14; Auckland, New Zealand; Web: www.ismrm.org

**39th Reunión Anual (SENR) Sociedad Española de Neuroradiología, 6th Congreso (SPNR) Nacional Sociedade Portuguesa de Neuroradiología.** November 10-13; Badajoz, Spain; Web: www.geyseco.es

**Medica 2010.** November 17-20; Düsseldorf, Germany; e-mail: info@medica.de; Web: www.medica.de

**9th Congress of the Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB).** November 18-21; New Delhi, India; Web: www.afsumb2010.com

**15th Congress of the Asian Pacific Society for Respirology (APSR).** November 22-25; Manila, Philippines; Web: www.apsr2010.org

**RSNA 2010 - Radiological Society of North America.** November 28 - December 3; Chicago, IL, USA; Web: rsna2010.rsna.org

## DECEMBER 2010

**Endovascular Summit 2010.** December 2-4; Sydney, NSW Australia; Web: www.endovascularsummit.net

**National Diagnostic Imaging Symposium 2010.** December 5-9; Lake Buena Vista, FL, USA; Web: www.worldclassme.com

**EUROECHO 2009 - European Association of Echocardiography.** December 8-11; Copenhagen, Denmark; Web: www.ecardio.org

**26th JERDO - Journées d'Endoscopie et de Radiologie Digestive Opératoire.** December 9-10; Paris, France; Web: www.jerdo2010.com

**2010 Chicago Multidisciplinary Symposium in Thoracic Oncology.** December 9-11; Chicago, IL, USA; Web: www.thoracicsymposium.org

**29th Annual Head to Toe Imaging Conference.** December 13-18; New York, NY, USA; Web: http://tools.med.nyu.edu

## JANUARY 2011

**NYU Clinical Imaging Symposium in Aruba.** January 3-7; Aruba; Web: www.med.nyu.edu

**The 4th Leuven Course on Head and Neck Cancer Imaging.** January 6-8; Leuven, Belgium; Web: www.kuleuven.be

**21ème Journées Européennes de la Société Française de Cardiologie.** January 12-15; Paris, France; Web: www.sfcadio.fr

**IROS 2011 - Gemeinsame Jahrestagung der Deutschen, Österreichischen und Schweizerischen Gesellschaften (DeGIR, ÖGIR & SSCVIR) für Interventionelle Radiologie.** January 13-15; Salzburg, Austria; Web: www.irosonline.org

**3rd Meeting of the Intraoperative Imaging Society (IOIS).** January 16-19; Zurich, Switzerland; Web: http://kongress2.imk.ch

**Society for Nuclear Medicine 2011 Mid-Winter Meetings.** January 20-23; Palm Springs, CA, USA; Web: interactive.snm.org

USA; Web: www.skeletalrad.org

**Arab Health 2011.** January 24-27; Dubai, UAE; Web: www.arabhealthonline.com

**IRIA2011 - 64th National Annual Conference of the Indian Radiological & Imaging Association.** January 28-31; New Delhi, India; e-mail: iriadeli2011@gmail.com; Web: www.iria.in

## FEBRUARY 2011

**13th Düsseldorf International Endoscopy Symposium.** February 4-5; Düsseldorf, Germany; Web: www.endo-duesseldorf.com

**13th Jornadas de la Sociedad Española de Radiología Músculo-Esquelética (SERME) y 4th Curso: Miembro Superior.** February 10-11; Palma de Mallorca, Spain; Web: www.geyseco.es

**Annual Symposium of the American Society of Spine Radiology (ASSR).** February 23-26; Honolulu, HI, USA; Web: http://theassr.org

**24th International Congress on Endovascular Interventions.** February 13-17; Phoenix, AZ, USA; Web: www.endovascularcongress.org

**ISUOG 2011 - 7th Scientific Meeting of the International Society for Ultrasound in Obstetrics and Gynecology.** February 25-27; Macau SAR, China; Web: www.isuogmacau2011.com

## MARCH 2011

**2011 Congress of the European Society of Breast Imaging (EUSOBI).** March 2-3; Vienna, Austria; Web: www.eusobi.org

**ECR 2011 - European Congress of Radiology.** March 3-7; Vienna, Austria; web: communications@myesr.org; Web: www.myesr.org

**SORSA - RSSA 2011 Imaging Conference - Joint Initiative of the Society of Radiographers of South Africa & Radiological Society of South Africa.** March 4-6; Durban, South Africa; Web: www.2011sorsarssa.co.za

**2011 Annual Meeting of the Society of Thoracic Imaging.** March 6-9; Bonita Springs, FL, USA; Web: www.thoracicrad.org/index.html

**Society of Skeletal Radiology (SSR) 2011 Annual Meeting.** March 13-16; Scottsdale, AZ, USA; Web: www.skeletalrad.org

USA; Web: www.skeletalrad.org

**6th BSCMR Annual Meeting - British Society of Cardiovascular Magnetic Resonance.** March 16; Leicester, UK; Web: www.bschr.org

**KIMES 2011 - 27th Korean International Medical and Hospital Equipment Show.** March 17-20; Seoul, Korea; Web: www.kimes.kr

**International Symposium on Spine and Paravertebral Sonography for Anaesthesia and Pain Medicine.** March 18-20; Hong Kong SAR, China; Web: http://usgraweb.hk

**Abdominal Radiology Course 2011.** March 20-25; Carlsbad, CA, USA; Web: www.sgr.org

**23rd International Medical Instruments and Equipment Exhibition.** March 25-27; Beijing, China; Web: www.chinamed.net.cn

**36th Annual Scientific Meeting of the Society of Interventional Radiology (SIR).** March 26-31; Chicago, IL, USA; Web: www.sirmmeeting.org

**2nd Intensive Interactive Brain and Spine Imaging Conference - University of Utah Neuroimaging.** March 28-April 1; Salt Lake City, UT, USA; Web: http://medicine.utah.edu

## APRIL 2011

**Radiology Update 2011: Annual Convention of the American Osteopathic College of Radiology.** April 11-15; Palm Beach, FL, USA; Web: www.aocr.org

**59th Annual Meeting of the Association of University Radiologists (AUR).** April 12-15; Boston, MA, USA; Web: www.aur.org

**2011 American Brachytherapy Society (ABS) Annual Meeting.** April 14-16; San Diego, CA, USA; Web: www.americanbrachytherapy.org

**2011 Annual Convention of the American Institute of Ultrasound in Medicine (AIUM).** April 14-17; New York, NY, USA; Web: www.aium.org

**2011 Annual Scientific Meeting of the Australasian Brachytherapy Group.** April 28-30; Perth, WA, Australia; Web: www.abg.org.au

**74th Annual Scientific Meeting of the Canadian Association of Radiologists.** April 28 - May 1; Montreal, QC, Canada; Web: www.car.ca

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**Imaging in Italy.** May 11-13; Lucca, Italy; Web: [www.phoenixconf.com/Italy.htm](http://www.phoenixconf.com/Italy.htm)

**Servei 2011 – 7th Congreso Nacional de la Sociedad Española de Radiología Vasculare e Intervencionista.** May 11-14; Valencia, Spain; Web: [www.geyseco.es](http://www.geyseco.es)

**American College of Radiology (ACR) Annual Meeting & Leadership Conference.** May 14-18; Washington DC, USA; Web: [www.acr.org](http://www.acr.org)

**ICNC10 - Nuclear Cardiology and Cardiac CT.** May 15-18; Amsterdam, the Netherlands; Web: [www.escardio.org](http://www.escardio.org)

**22nd Annual Meeting of the European Society of Gastrointestinal and Abdominal Radiology (ESGAR).** May 21-24; Venice, Italy; Web: [www.esgar.org](http://www.esgar.org)

**Hospitalar 2011.** May 24-27; Sao Paulo, Brazil; Web: [www.hospitalar.com](http://www.hospitalar.com)

**International Congress of Pediatric Radiology (IPR).** May 28-31; London, UK; Web: [www.espr.org](http://www.espr.org)

JUNE 2011

**92. Deutscher Röntgenkongress und des 6. Gemeinsamen Kongresses von DRG und ÖRG.** June 1-4; Hamburg, Germany; Web: [www.roentgenkongress.de](http://www.roentgenkongress.de)

**SIIM 2011 Annual Meeting - The Society of Imaging Informatics in Medicine.** June 2-5; Washington, DC, USA; Web: [www.scarnet.org](http://www.scarnet.org)

**SNM 2011 Annual Meeting - Society for Nuclear Medicine.** June 4-8, San Antonio, TX, USA; Web: [www.snm.org](http://www.snm.org)

**49th Annual Meeting of the American Society of Neuroradiology (ASNR)** June 4-9; Seattle, WA, USA; Web: [www.asnr.org](http://www.asnr.org)

**UKRC 2011 – United Kingdom Radiological Congress.** June 6-8; Manchester, UK; Web: [www.ukrc.org.uk](http://www.ukrc.org.uk)

European Society of Musculoskeletal

**Radiology (ESSR) 2011 Annual Scientific Meeting.** June 9-11; Crete, Greece; Web: [www.essr.org](http://www.essr.org)

**ASCI 2011 – 5th Congress of the Asian Society of Cardiovascular Imaging.** June 18-19; Hong Kong SAR, China; Web: [www.asci-heart.org](http://www.asci-heart.org)

**15th Annual Meeting of the Clinical Magnetic Resonance Society (CMRS).** June 23-26; Orlando, FL, USA; Web: [www.cmrs.com](http://www.cmrs.com)

**Joint Educational and Scientific Meeting of the European Society of Thoracic Imaging (ESTI) and the Fleischner Society.** June 23-25; Heidelberg, Germany; Web: [www.esti2011.org](http://www.esti2011.org)

**EHRA EUROPACE 2011.** June 26-29; Madrid, Spain; Web: [www.esradio.org](http://www.esradio.org)

JULY 2011

**The 2nd Joint Symposium of the European Society of Neuroradiology (ESNR) and American Society of Spine Radiology (ASSR).** July 1-3; Barcelona, Spain; Web: [www.spineinternational.org](http://www.spineinternational.org)

AUGUST 2011

**13th World Congress of the World Federation for Ultrasound in Medicine in Biology (WFUMB).** August 26-29; Vienna, Austria; Web: [www.wfumb2011.org](http://www.wfumb2011.org)

SEPTEMBER 2011

**45th Annual Meeting of the American Society of Head and Neck Radiology (ASHNR).** September 7-11; Coronado, CA, USA; Web: [www.ashnr.org](http://www.ashnr.org)

**CIRSE 2011 - Cardiovascular and Interventional Radiological Society of Europe.** September 10-14; Munich, Germany; Web: [www.cirse.org](http://www.cirse.org)

**35th Congress of the European Society of Neuroradiology (ESNR).** September 22-25; Antwerp, Belgium; Web: [www.esnr.org](http://www.esnr.org)

OCTOBER 2011

**26th Congresso Nazionale Associazione Italiana di Neuroradiologia.** October 5-8; Florence, Italy; Web: [www.ainr.it](http://www.ainr.it)



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